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Et vidit Deus lucem quod esset bona
Mundus Intellectualis
SYLVA SYLVARVM
or
A NATVRALL HISTORY
In ten Centuries.
Written by the right Honble Francis
Lo: Verulam Viscount Sct Alban.
Published after ye Authors Death
by W: RAWLEY Dr of Divi
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Tho: Cecill sculp:
LONDON
Printed for W: Lee and are to be sould at
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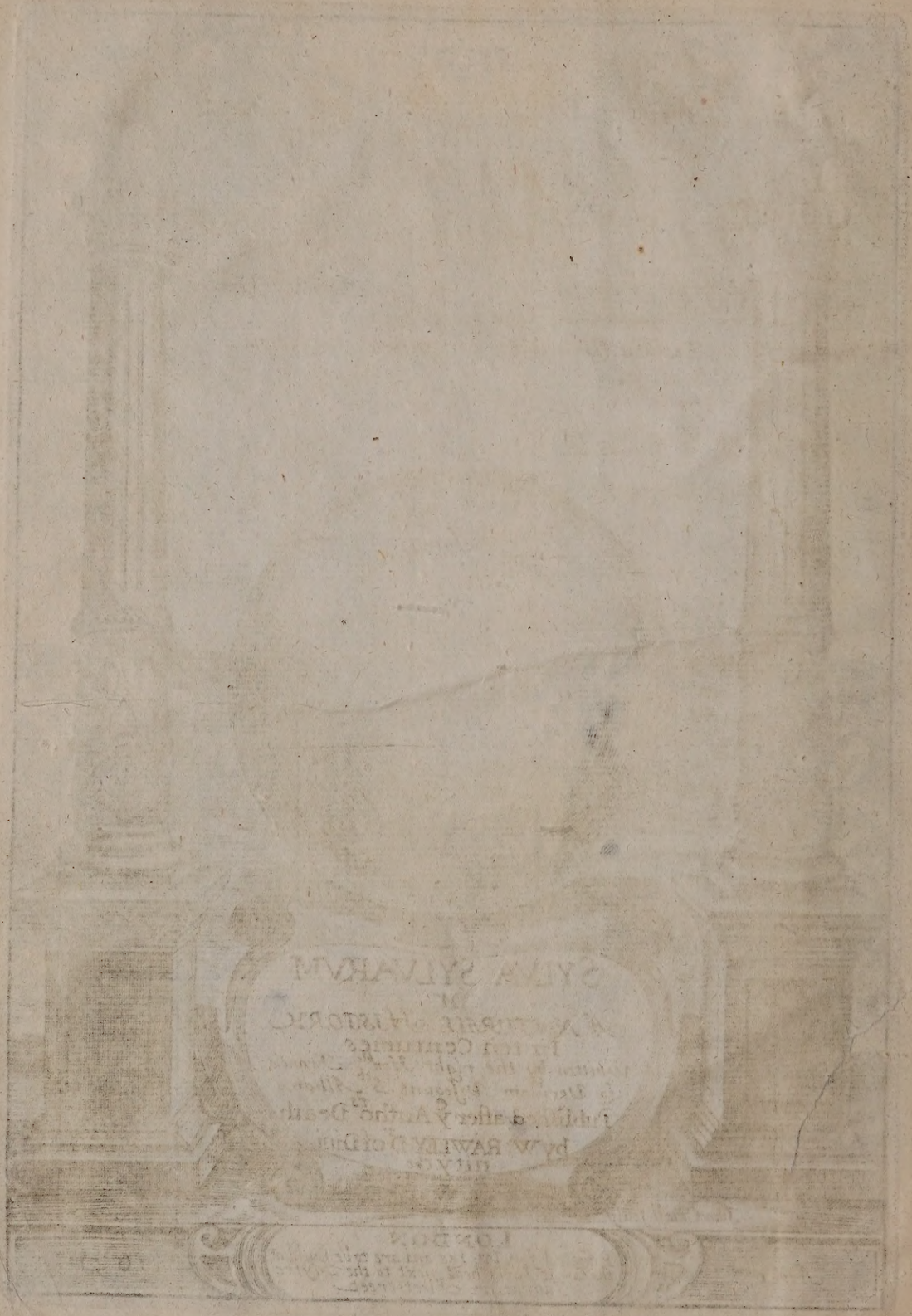

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SYLVA SYLVARVM:

OR,

A Naturall Historie.

IN TEN CENTVRIES.

VVRITTEN BY THE RIGHT *Honourable* FRANCIS LO. *Verulam* Viscount S^t^ ALBAN.

Published after the Authors death,

BY WILLIAM RAVVLEY *Doctor in Divinity, one of his Majesties Chaplaines.*

Hereunto is now added an Alphabeticall Table of the principall things contained in the whole Worke.

The fifth Edition.

LONDON,
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TO THE MOST HIGH AND MIGHTY PRINCE CHARLES,

BY THE GRACE OF GOD, King of *Great Britaine, France,* and *Ireland,* Defender of the Faith, &c.

May it please your most Excellent Majestie;

THE whole Body of the *Naturall History*, either designed or written, by the late *Lord Viscount S. Alban*, was dedicated to your *Majestie*, in his Booke *De Ventis*, about foure yeares past, when your *Majestie* was *Prince*: So as there needed no new Dedication of this *Worke*, but onely in all humblenesse, to let your *Majestie* know, it is yours. It is true; if that *Lord* had lived, your *Majestie*, ere long, had beene invoked, to the Protection of another *History*; whereof, not *Natures Kingdome*, as in this, but these of your *Majesties*,

(during the Time and *Raigne* of *King Henry* the *Eighth*) had beene the Subiect: Which since it died under the Designation meerely, there is nothing left, but your *Majesties* Princely Goodnesse, graciously to accept of the Vndertakers Heart, and Intentions; who was willing to have parted, for a vvhile, vvith his Darling *Philosophie*, that he might have attended your Royall Commandement, in that other *Worke*. Thus much I have beene bold, in all lowlinesse, to represent unto your *Majestie*, as one that vvas trusted vvith his *Lordships Writings*, even to the last. And as this *Worke* affecteth the *Stampe* of your *Majesties Royall Protection*, to make it more currant to the *World*; So under the *Protection* of this *Worke*, I presume in all humblenesse to approach your *Majesties* presence; And to offer it up into your *Sacred Hands*.

Your MAIESTIES *most Loyall and Devoted Subject*,

VV. RAVVLEY.

To the Reader.

HAving had the Honour to be continually with my *Lord*, in compiling of this *Worke*; And to be employed therein; I have thought it not amisse, (with his Lordships good leave and liking,) for the better satisfaction of those that shall reade it, to make knowne somewhat of his Lordships Intentions, touching the Ordering, and Publishing of the same. I have heard his Lordship often say; that if he should have served the glory of his own Name, he had been better not to have published this *Naturall History*: For it may seeme an Indigested Heap of Particulars; And cannot have that Lustre, which Bookes cast into Methods have: But that he resolved to preferre the good of Men, and that which might best secure it, before any thing that might have Relation to Himselfe. And he knew well, that there was no other vvay open, to unloose Mens mindes, being bound; and (as it were) Maleficiate, by the Charmes of deceiving Notions, and Theories; and thereby made Impotent for Generation of Workes; But onely no where to depart from the Sense, and cleare experience; But to keepe close to it, especially in the beginning: Besides, this *Naturall History* was a Debt of his, being designed and set down for a third part of the *Instauration*. I have also heard his Lordship discourse, that Men (no doubt) will thinke many of the *Experiments* contained in this Collection, to be Vulgar and Triviall: Meane and Sordid; Curious and Fruitlesse: And therefore he wisheth, that they would have perpetually before their Eyes, what is now in doing: And the difference between this *Naturall Historie*, and others. For those *Naturall Histories*; which are Extant, being gathered for De-

light and Use, are full of pleasant Descriptions and Pictures; and affect and seeke after Admiration, Rarities, and Secrets. But contrariwise, the Scope which his Lordship intendeth, is to write such a *Naturall Historie*, as may be Fundamentall to the Erecting and Building of a true *Philosophy*: For the Illumination of the *Understanding*; the Extracting of *Axiomes*; and the producing of many Noble *Workes*, and *Effects*. For he hopeth by this meanes, to acquit himselfe of that, for which he taketh *Himselfe* in a sort bound; And that is the Advancement of all Learning and Sciences. For having in this present Worke Collected the Materials for the Building; And in his *Novum Organum* (of which his Lordship is yet to publish a Second Part) set downe the Instruments and Directions for the Work; Men shall now bee wanting to themselves, if they raise not Knowledge to that perfection, whereof the Nature of Mortall Men is capable. And in this behalfe, I have heard his Lo. speake complainingly; That his Lordship (who thinketh that he deserveth to be an Architect in this building) should be forced to be a Work-man, and a Labourer; And to digge the Clay, and burne the Brick; And more than that, (according to the hard Condition of the *Israelites* at the latter end) to gather the Straw and Stubble, over all the Fields, to burne the Bricks withall. For he knoweth, that except he doe it, nothing will be done: Men are so set to despise the meanes of their owne good. And as for the *Basenesse* of many of the Experiments; As long as they be Gods Works, they are honourable enough. And for the *Vulgarnes* of them; true *Axiomes* must be drawne from plaine Experience, and not from doubtfull; And his Lordships course is to make Wonders Plaine, and not Plaine things Wonders; And that Experience likewise must be broken and grinded, and not whole, or as it groweth. And for *Use*; his Lordship hath often in his Mouth, the two kindes of *Experiments*; *Experimenta Fructifera*, and *Experimenta Lucifera*; *Experiments of Use*, and *Experiments of Light*: And he reporteth himselfe, whether he were not a strange Man, that should thinke that Light hath no Use, because it hath no Matter. Further his Lordship thought good also, to adde unto many of the *Experiments* themselves, some *Glosse* of the *Causes*; that in the succeeding worke of *Interpreting Nature*, and *Framing Axiomes*, all things may bee in more readinesse. And for the *Causes* herein by Him assigned; his Lordship perswadeth Himselfe, they are farre more certaine, than

those

those that are rendred by Others; Not for any Excellency of his owne Wit, (as his Lordship is wont to say) but in respect of his continuall Conversation with *Nature*; and *Experience*. He did consider likewise, that by this addition of *Causes*, mens mindes (which make so much haste to finde out the *Causes* of things;) would not thinke themselves utterly lost, in a vast wood of *Experience*, but stay upon these *Causes*, (such as they are, a little, till true *Axiomes* may be more fully discovered. I have heard his Lordship say also, that one great reason, why he would not put these Particulars into any exact *Method*, (though he that looketh attentively into them, shall finde that they have a secret Order) was becausse he conceived that other men would now thinke that they could doe the like; And so go on with a further Collection: which if the *Method* had been Exact, many would have despaired to attaine by Imitation. As for his Lordships love of Order, I can referre any Man to his Lordships Latine Booke, *De Augmentis Scientiarum*; which (if my Judgement be any thing) is written in the Exactest Order, that I know any VVriting to be. I will conclude with an usuall speech of his Lordships. That this VVorke of his *Naturall Historie*, is the *World*, as GOD made it, and not as Men have made it; For that it hath nothing of Imagination.

W. Rawley.

This Epistle is the same, that should have beene prefixed to this Booke, if his Lordship had lived.

thole that are rendred by Others: Nor for any Excellency of his owne Wit, (as his Lordship is wont to say) but in respect of his continuall Conversation with Nature; and Experience. He did consider likewise, that by this addition of Chapters, many mistakes (which make so much haste to finde out the Causes of things;) would not thinke themselves utterly lost, in a vast wood of Experience, but stay upon these Chapters, (such as they are, a little, till true Answer may be more fully discovered. I have heard his Lordship say also, that one great reason, why he would not put these Particulars into any exact Method, (though he that lookes attentively into them, shall finde that they have a secret Order) was because he conceived that other men would now thinke that they could doe the like: And so go on with a further Collection: which if the Method had been Exact, many would have despaired to attaine by imitation. As for his Lordships love of Order, I can refere any Man to his Lordships Latine Booke, De Augmentis Scientiarum, which (if any Judgement be any thing) is written in the Exactest Order, that I know any Writing to be. I will conclude with an humble Speech of his Lordships. That this Worke of his Naturall History, is the Worke, as GOD made it, and not as Men have made it; For that it hath nothing of Imagination.

This Epistle is the same, that should have been prefixed to this Booke, if his Lordship had lived.

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Of Maleficiating. Exp. 1. pag. 192
Of the Rise of Liquours, or Powders, by meanes of Flame. Exp. ibid.

Of the Influences of the Moone. Exp.8. ibid.
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Century X.

OF the Transmission and Influxe of Immateriate Vertues, and the Force of Imagination; whereof there bee Experiments Monitory three; In all, Exp.11. pag.197
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NATU-

NATVRALL HISTORIE.

I. Century.

DIgge a *Pit* upon the *Sea ſhore*, ſomewhat above the High-water Marke, and ſinke it as deepe as the Low-water Marke; And as the *Tide* commeth in, it will fill with *Water*, Freſh and Potable. This is commonly practized upon the Coaſt of *Barbary*, where other freſh *Water* is wanting. And *Cæſar* knew this well, when he was beſieged in *Alexandria*: For by digging of *Pits* in the *Sea ſhore*, hee did fruſtrate the Laborious Workes of the Enemies, which had turned the *Sea-Water* upon the Wels of *Alexandria*; And ſo ſaved his Army, being then in Deſperation. But *Cæſar* miſtooke the Cauſe, For hee thought that all *Sea-Sands* had Naturall Springs of *Freſh Water*. But it is plaine, that it is the *Sea-water*; becauſe the Pit filleth according to the Meaſure of the *Tide*: And the *Sea-water* paſſing or Strayning through the Sands, leaveth the Saltneſſe.

Experiments in *Conſort*, touching the Straining and Paſſing of Bodies, one through another: which they call *Percolation*.

1

I remember to have Read, that Tryall hath beene made of *Salt-water* paſſed through *Earth*; through Ten Veſſels, one within another, and yet it hath not loſt his Saltneſſe, as to become potable: But the ſame Man ſaith, that (by the Relation of Another) *Salt-water* drayned through twenty Veſſels, hath become Freſh. This *Experiment* ſeemeth to croſſe that other of *Pits*, made by the *Sea-ſide*; and yet but in part, if it be true, that twenty Repetitions doe the Effect. But it is worth the Note, how poore the Imitations of Nature are, in common courſe of *Experiments*, except they bee led by great Judgement, and ſome good Light of *Axiomes*. For firſt, there is no ſmall difference betweene a Paſſage of *Water* through twenty ſmall Veſſels; And through ſuch a diſtance, as betweene the Low-water and High-water Mark. Secondly, there is a great difference betweene Earth and Sand. For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free: And beſides, Earth doth not ſtraine the Water ſo finely, as Sand doth. But there is a third Point, that I ſuſpect as much, or more than the other Two; And that is, that in the *Experiment* of *Tranſmiſſion* of the *Sea-water* into the *Pits*, the *Water* riſeth; But in the *Experiment* of Tranſmiſſion of the *Water* through the Veſſels, it falleth: Now certain it is, that the Salter Part of *Water*, (once

2

Salted throughout) goeth to the Bottome. And therefore no marvaile, if the Drayning of *Water* by descent, doth not make it fresh: Besides, I doe somewhat doubt, that the very Dashing of the *Water*, that commeth from the Sea, is more proper to strike off the Salt part, than where the *Water* slideth of her owne Motion.

3 It seemeth *Percolation* or *Transmission*, (which is commonly called *Straining*,) is a good kinde of *Separation*, Not onely of Thicke from Thin, and Grosse from Fine; But of more subtile Natures; And varieth according to the Body through which the *Transmission* is made. As if through a woollen Bagg, the Liquour leaveth the Fatnesse; If through Sand, the Saltnesse; &c. They speake of Severing Wine from Water, passing it through Ivy wood, or through other the like porous Body; But *Non constat*.

4 The *Gumm* of *Trees* (which we see to bee commonly shining and cleare) is but a fine Passage or *Straining* of the Juyce of the Tree, through the Wood and Barke. And in like manner, *Cornish Diamonds*, and *Rock Rubies*, (which are yet more resplendent than *Gumms*) are the fine Exudations of *Stone*.

5 *Aristotle* giveth the Cause, vainly, why the *Feathers* of *Birds* are of more lively Colours, than the *Haires* of *Beasts*; for no *Beast* hath any fine Azure, or Carnation, or Greene *Haire*. He saith, It is, because *Birds* are more in the Beames of the Sunne, than *Beasts*; but that is manifestly untrue; For *Cattle* are more in the Sunne than *Birds*, that live commonly in the Woods, or in some Covert. The true Cause is, that the Excrementitious Moisture of living Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beasts*, passeth in *Birds* through a finer and more delicate Strainer, than it doth in *Beasts*: For *Feathers* passe through Quills; And *Haire* through Skin.

6 The *Clarifying* of *Liquors* by Adhesion, is an Inward *Percolation*; And is effected, when some Cleaving Body is Mixed and Agitated with the *Liquors*, whereby the grosser Part of the *Liquor* sticks to that Cleaving Body; And so the finer Parts are freed from the Grosser. So the *Apothecaries* clarifie their *Sirrups* by whites of Eggs, beaten with the Juices which they would clarifie; which whites of Eggs gather all the Dregs and grosser Parts of the Juice to them; And after the *Sirrup* being set on the Fire, the whites of Egges themselves harden, and are taken forth. So *Ippocrasse* is clarified by mixing with Milke; And stirring it about, And then passing it through a Woollen Bagg, which they call *Hippocrates Sleeve*, And the Cleaving Nature of the Milke draweth the Powder of the Spices, and grosser parts of the *Liquor* to it; and in the passage they stick upon the Woollen bagge.

7 The *Clarifying* of *Water*, is an *Experiment* tending to Health; besides the pleasure of the Eye, when *Water* is Chrystaline. It is effected by casting in and placing Pebbles, at the Head of a Current; that the *Water* may straine through them.

8 It may be, *Percolation* doth not onely cause Clearenesse and Splendour, but Sweetnesse of Savour. For that also followeth, as well as Clearnesse, when the Finer Parts are severed from the Grosser. So it is found, that the Sweats of Men that have much Heat, and exercise much, and have cleane Bodies, and fine Skinnes, doe smell sweet; As was said of *Alexander*; And we see, commonly, that *Gumms* have sweet Odours.

Experiments in Consort touching *Motion* of *Bodies* upon their *Pressure*.

9 TAke a *Glasse*, and put *Water* into it, and wet your Finger, and draw it round about the Lip of the Glasse, pressing it somewhat hard; And after you have drawne it some few times about, it will make the Water frisk and

and ſprinkle up, in a fine Dew. This *Inſtance* doth excellently Demonſtrate the Force of *Compreſſion* in a Solid Bodie. For whenſoever a Solid Body (as Wood, Stone, Metall, &c.) is preſſed, there is an inward Tumult in the parts thereof; ſeeking to deliver themſelves from the Compreſſion: And this is the Cauſe of all *Violent Motion*. Wherein it is ſtrange in the higheſt Degree, that this *Motion* hath never beene obſerved, nor inquired; It being of all *Motions*, the moſt Common, and the Chiefe Root of all *Mechanicall Operations*. This *Motion* worketh in round at firſt, by way of Proofe, and Search, which way to deliver it ſelfe; And then worketh in Progreſſe, where it findeth the Deliverance eaſieſt. In *Liquors* this *Motion* is viſible: For all Liquors ſtrucken make round Circles, and withall Daſh; but in *Solids*, (which breake not,) it is ſo ſubtile, as it is inviſible; but nevertheleſſe bewrayeth it ſelfe by many effects; as in this *Inſtance* whereof we ſpeake. For the *Preſſure* of the Finger furthered by the wetting (becauſe it ſticketh ſo much the better unto the Lip of the *Glaſſe*,) after ſome continuance, putteth all the ſmall Parts of the *Glaſſe* into worke; that they ſtrike the *Water* ſharply; from which *Percuſſion* that Sprinkling commeth.

If you ſtrike or pierce a *Solid Body*, that is Brittle, as *Glaſſe*, or *Sugar*, it breaketh not onely, where the immediate force is; but breaketh all about into ſhivers and fitters; The *Motion*, upon the *Preſſure*, ſearching all wayes; and breaking where it findeth the *Body* weakeſt. 10

The *Powder* in *Shot*, being Dilated into ſuch a *Flame*, as endureth not *compreſſion*; Moveth likewiſe in round, (The *Flame* being in the Nature of a *liquid Body*:) Sometimes recoyling; Sometimes breaking the *Piece*; But generally diſcharging the *Bullet*, becauſe there it findeth eaſieſt Deliverance. 11

This *Motion* upon *Preſſure*, and the Reciprocall thereof, which is *Motion* upon *Tenſure*; wee uſe to call (by one common Name) *Motion of Libertie*; which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or Dimenſion, deliveret hand reſtoreth it ſelfe to the Naturall: As when a *Blowne Bladder* (Preſſed) riſeth againe; or when *Leather* or *Cloth* tentured ſpring backe. Theſe two *Motions* (of which there bee infinite Inſtances,) we ſhall handle in due place. 12

This *Motion* upon *Preſſure* is excellently alſo demonſtrated in *Sounds*; As when one Chimeth upon a *Bell*, it ſoundeth; But as ſoone as he layeth his hand upon it, the *Sound* ceaſeth: And ſo, the *Sound* of a *Virginall String*, as ſoone as the Quill of the Jack falleth from it, ſtoppeth. For theſe *Sounds* are produced, by the ſubtile Percuſſion of the Minute parts, of the *Bell*, or *String*, upon the Aire; All one, as the *Water* is cauſed to leape by the ſubtile Percuſſion of the Minute parts of the *Glaſſe*, upon the Water, whereof we ſpake a little before in the ninth *Experiment*. For you muſt not take it to be, the locall *Shaking* of the *Bell*, or *String*, that doth it. As wee ſhall fully declare, when we come hereafter to handle *Sounds*. 13

Experiments in Conſort touching *Separations* of *Bodies by Weight*. 14

TAke a *Glaſſe* with a *Belly* and a long *Neb*; fill the *Belly* (in part) with *Water*: Take alſo another *Glaſſe*, whereinto put *Claret Wine* and *Water* mingled; Reverſe the firſt *Glaſſe*, with the *Belly* upwards, Stopping the *Nebb* with your finger; Then dip the Mouth of it within the Second *Glaſſe*, and remove your Finger: Continue it in that poſture for a time; And it will unmingle the *Wine* from the *Water*: The *Wine* aſcending and ſettling in the top of the upper *Glaſſe*; And the *Water* deſcending and ſettling in the bottome of the lower *Glaſſe*. The paſſage is apparent to the Eye; For

you ſhall ſee the *Wine*, as it were, in a ſmall veine, riſing through the *Water*. For handſomneſſe ſake (becauſe the Working requireth ſome ſmall time) it were good you hang the upper *Glaſſe* upon a Naile. But as ſoone as there is gathered ſo much pure and unmixed *water* in the Bottome of the Lower *Glaſſe*, as that the Mouth of the upper *Glaſſe* dippeth into it, the *Motion* ceaſeth.

15 Let the Upper *Glaſſe* be *Wine*, and the Lower *Water*; there followeth no *Motion* at all. Let the Upper *Glaſſe* be *Water* pure, the Lower *Water* coloured; or contrariwiſe; there followeth no *Motion* at all. But it hath been tryed, that though the Mixture of *Wine* and *Water*, in the Lower *Glaſſe*, bee three parts *Water*, and but one *Wine*; yet it doth not dead the *Motion*. This *Separation* of *Water* and *Wine* appeareth to bee made by *Weight*; for it muſt be of *Bodies* of unequall *Weight*, or elſe it worketh not; And the Heavier *Body* muſt ever bee in the upper *Glaſſe*. But then note withall, that the *Water* being made penſile, and there being a great *Weight* of *Water* in the *Belly* of the *Glaſſe*, ſuſtained by a ſmall Piller of *Water* in the Neck of the *Glaſſe*; It is that, which ſetteth the *Motion* on worke: For *Water* and *Wine* in one *Glaſſe*, with long ſtanding, will hardly ſever.

16 This *Experiment* would be Extended from Mixtures of ſeverall *Liquours*, to *Simple Bodies*, which Conſiſt of ſeverall Similare Parts: Try it therefore with *Broyne* or *Salt water*, and *Freſh water*: Placing the *Salt water* (which is the heavier) in the upper *Glaſſe*; And ſee whether the *Freſh* will come above. Trie it alſo with *Water thick Sugred*, and *Pure water*; and ſee whether the *water* which commeth above, will loſe his Sweetneſſe: For which purpoſe it were good there were a little Cock made in the Belly of the upper *Glaſſe*.

Experiments in Conſort touching *Iudicious* and *Accurate Infuſions*, both in *Liquors*, and *Aire*.

17 IN *Bodies* containing Fine Spirits, which doe eaſily diſſipate, when you make *Iufuſions*, the Rule is; A ſhort Stay of the *Body* in the *Liquour* receiveth the Spirit; And a longer Stay confoundeth it; becauſe it draweth forth the Earthy Part withall; which embaſeth the finer. And therefore it is an Errour in *Phyſitians*, to reſt ſimply upon the Length of ſtay, for increaſing the vertue. But if you will have the *Infuſion* ſtrong, in thoſe kind of *Bodies*, which have fine Spirits, your way is, not to give Longer time, but to repeat the *Infuſion* of the *Body* oftner. Take *Violets*, and infuſe a good Pugill of them in a Quart of Vineger; Let them ſtay three quarters of an houre, and take them forth; And refreſh the *Infuſion* with like quantity of new *Violets*, ſeven times; And it will make a Vineger ſo freſh of the *Flower*, as if a Twelve-moneth after, it be brought you in a Saucer, you ſhall ſmell it before it come at you. Note, that it ſmelleth more perfectly of the Flower, a good while after, than at firſt.

18 This Rule, which we have given, is of ſingular uſe, for the Preparations of *Medicines*, and other *Infuſions*. As for Example; the Leafe of *Burrage* hath an Excellent Spirit, to repreſſe the fuliginous Vapour of Dusky Melancholy, and ſo to cure Madneſſe: But nevertheleſſe, if the Leafe bee infuſed long, it yeeldeth forth but a raw ſubſtance, of no Vertue: Therefore I ſuppoſe, that if in the Muſt of Wine, or Wort of Beere, while it worketh, before it bee Tunned, the *Burrage* ſtay a ſmall time, and bee often changed with freſh; It will make a Soveraigne Drinke for Melancholy Paſſions. And the like I conceive of *Orenge Flowers*.

19 *Rubarb* hath manifeſtly in it Parts of cõtrary Operations: Parts that purge; And parts that binde the body: And the firſt lay looſer, and the latter lay deeper:

deeper: So that if you infuſe *Rubarb* for an houre, and cruſh it well, it will purge better, and binde the Body leſſe after the purging, than if it ſtood twenty foure houres; This is tryed: But I conceive likewiſe, that by Repeating the *Infuſion* of *Rubarb*, ſeverall times, (as was ſaid of Violets,) letting each ſtay in but a ſmall time; you may make it as ſtrong a *Purging Medicine*, as *Scammony*. And it is not a ſmall thing wonne in *Phyſick*, if you can make *Rubarb*, and other *Medicines* that are *Benedict*, as ſtrong Purgers, as thoſe that are not without ſome Malignity.

Purging Medicines, for the moſt part, have their *Purgative* Vertue, in a fine Spirit; As appeareth by that they endure not boyling, without much loſſe of vertue. And therefore it is of good uſe in *Phyſick*, if you can retaine the *Purging* Vertue, and take away the Unpleaſant taſte of the *Purger*; which it is like you may doe, by this Courſe of *Infuſing* oft, with little ſtay. For it is probable, that the Horrible and Odious Taſte, is in the Groſſer part. 20

Generally, the working by *Infuſions*, is groſſe and blinde, except you firſt trie the Iſſuing of the ſeverall Parts of the Bodie, which of them Iſſue more ſpeedily, and which more ſlowly; And ſo by apportioning the time, can take and leave that Quality, which you deſire. This to know, there be two wayes; The one to trie what long ſtay, and what ſhort ſtay worketh, as hath beene ſaid: The other to trie in Order, the ſucceeding *Infuſions*, of one and the ſame Bodie, ſucceſſively, in ſeverall *Liquours*. As for example; Take *Orenge-Pils*, or *Roſe-Mary*, or *Cinnamon*, or what you will; And let them *Infuſe* halfe an houre in *Water*: Then take them out; and *Infuſe* them againe in other *Water*; And ſo the third time: And then taſte and conſider the *firſt Water*, the *Second*, and the *Third*: And you will find them differing, not only in Strength and Weakneſſe, but otherwiſe in Taſte, or Odour; For it may be the *Firſt water* will have more of the Sent, as more Fragrant; And the *Second* more of the Taſte, as more bitter or Biting, &c. 21

Infuſions in *Aire*, (for ſo we may well call *Odours*) have the ſame diverſities with *Infuſions* in *Water*; In that the ſeverall *Odours* (which are in one Flower, or other Body) iſſue at ſeverall times; Some earlier, ſome later: So wee finde that *Violets*, *Woodbines*, *Strawberries*, yeeld a pleaſing Sent, that commeth forth firſt; But ſoone after an ill Sent quite differing from the Former. Which is cauſed, not ſo much by Mellowing, as by the late Iſſuing of the Groſſer Spirit. 22

As we may deſire to extract the fineſt Spirits in ſome Caſes; So we may deſire alſo to diſcharge them (as hurtfull) in ſome other. So *Wine burnt*, by reaſon of the Evaporating of the finer Spirit, enflameth leſſe, and is beſt in Agues: *Opium* leeſeth ſome of his poyſonous Qualitie, if it be vapoured out, mingled with *Spirit* of *Wine*, or the like: *Sean* leeſeth ſomewhat of his windineſſe by Decocting; And (generally) ſubtile or windy Spirits are taken off by Incenſion, or Evaporation. And even in *Infuſions* in things that are of too high a Spirit, you were better powre off the firſt *Infuſion*, after a ſmall time, and uſe the latter. 23

Experiment Solitary touching the *Appetite* of *Continuation in Liquids*.

Bubbles are in the forme of an *Hemiſphere*; *Aire* within, and a little Skin of *Water* without: And it ſeemeth ſomewhat ſtrange, that the *Aire* ſhould riſe ſo ſwiftly, while it is in the *Water*; And when it commeth to the top, ſhould be ſtayed by ſo weake a Cover as that of the *Bubble* is. But as for the ſwift Aſcent of the *Aire*, while it is under the *Water*, that is a *Motion* of *Percuſſion* from the *Water*; which it ſelfe deſcending, driveth up the Aire; and no *Motion* of *Levity* in the *Aire*. And this *Democritus* 24

called *Motus Plagæ*. In this Common *Experiment*, the Cauſe of the Encloſure of the *Bubble* is, for that the Appetite to reſiſt Separation, or Diſcontinuance, (which in ſolide *Bodies* is ſtrong) is alſo in *Liquours*, though fainter and weaker; As wee ſee in this of the *Bubble*: we ſee it alſo in little Glaſſes of Spittle that children make of Ruſhes; And in Caſtles of Bubbles, which they make by blowing into *water*, having obtained a little Degree of Tenacity by Mixture of Soape: Wee ſee it alſo in the *Stillicides* of *water*, which if there be *water* enough to follow, will Draw themſelves into a ſmall thred, becauſe they will not diſcontinue; But if there be no Remedy, then they caſt themſelves into round Drops; which is the Figure, that ſaveth the Body moſt from Diſcontinuance: The ſame Reaſon is of the Roundneſſe of the *Bubble*, as well for the Skin of *Water*, as for the *Aire* within: For the *Aire* likewiſe avoideth *Diſcontinuance*; And therefore caſteth it ſelfe into a round Figure. And for the ſtopp and Arreſt of the *Aire* a little while, it ſheweth that the *Aire* of it ſelfe hath little, or no Appetite, of Aſcending.

Experiment Solitary touching the making of *Artificiall Springs*. 25

THE Rejection, which I continually uſe, of *Experiments*, (though it appeareth not) is infinite; But yet if an *Experiment* be probable in the Worke, and of great Uſe, I receive it, but deliver it as doubtfull. It was reported by a Sober Man, that an *Artificiall Spring* may be made thus: Finde out a hanging Ground, where there is a good quick Fall of Rain-water. Lay a Halfe-Trough of Stone, of a good length, three or four foot deepe within the ſame Ground; with one end upon the high Ground, the other upon the low. Cover the Trough with Brakes a good thickneſſe, and caſt Sand upon the Top of the Brakes: You ſhall ſee, (ſaith hee) that after ſome ſhowres are paſt, the lower end of the Trough will runne like a *Spring* of *water*: which is no marvaile, if it hold, while the Raine-water laſteth; But hee ſaid it would continue long time after the Raine is paſt: As if the water did multiply it ſelfe upon the Aire, by the helpe of the Coldneſſe and Condenſation of the Earth, and the Conſort of the firſt Water.

Experiment Solitary touching the *Venomous Quality* of *Mans Fleſh*. 26

THE *French*, (which put off the Name of the *French Diſeaſe*, unto the Name of the *Diſeaſe* of *Naples*,) doe report, that at the Siege of *Naples*, there were certaine wicked Merchants that Barrelled up *Mans fleſh*, (of ſome that had been lately ſlain in *Barbary*) and ſold it for *Tunney*; And that upon that foule and high Nouriſhment, was the Originall of that *Diſeaſe*. Which may well bee; For that it is certaine, that the *Caniballs* in the *Weſt Indies*, eat *Mans fleſh*; And the *Weſt Indies* were full of the Pocks when they were firſt diſcovered: And at this day the *Mortaleſt poiſons*, practiſed by the *Weſt Indians*, have ſome Mixture of the Bloud, or Fat, or Fleſh of *Man*: And divers Witches, and Sorcereſſes, as well amongſt the *Heathen*, as amongſt the *Chriſtians*, have fed upon *Mans fleſh*, to aid (as it ſeemeth) their Imagination, with high and foule Vapours.

Experiment Solitary touching the *Verſion* and *Tranſmutation* of *Aire* into *water*. 27

IT ſeemeth that there bee theſe wayes (in likelihood) of *Verſion* of *Vapours* or *Aire*, into *Water* and *Moiſture*. The firſt is *Cold*; which doth manifeſtly Condenſe; as wee ſee in the *Contracting of the Aire* in the *Weather-Glaſſe*; whereby it is a Degree nearer to *Water*. We ſee it alſo in the *Generation of Springs*, which the *Ancients* thought (very probably) to be made by the *Verſion* of *Aire* into *Water*, holpen by the *Reſt*, which the *Aire* hath in thoſe Parts; whereby it cannot diſſipate. And by the *Coldneſſe* of *Rocks*; for there

there *Springs* are chiefly generated. We see it also in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; which produceth *Dewes*, and *Raines*. And the Experiment of Turning *water* into *Ice*, by Snow, Nitre, and Salt, (whereof we shall speak hereafter,) would be transferred to the Turning of *Aire* into *Water*. The Second way is by *Compression*; As in *Stillatories*, where the Vapour is turned back, upon it selfe, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* upon the Covers of *Boyling Pots*. And in the *Dew* towards *Raine*, upon *Marble*, and *wainscot*. But this is like to doe no great effect; Except it be upon Vapours, and grosse *Aire*, that are already very neare in Degree to Water. The Third is that, which may bee searched into, but doth not yet appeare; which is, by *Mingling* of *moist Vapours* with *Aire*; And trying if they will not bring a Returne of more *water*, than the *Water* was at first: For if so; That Increase is a *Version* of the *Aire*: Therefore put water into the Bottome of a *Stillatory*, with the Neb stopped; Weigh the *Water* first; Hang in the Middle of the *Stillatory* a large *Spunge*; And see what Quantity of *Water* you can crush out of it; And what it is more, or lesse, compared with the *water* spent; For you must understand, that if any *Version* can be wrought, it will be easilieſt done in small Pores: And that is the Reason why we prescribe a *Spunge*. The Fourth way is Probable also, though not Appearing; Which is, by *Receiving the Aire* into the small *Pores of Bodies*; For (as hath beene said) every thing in small Quantity is more easie for *version*; And Tangible Bodies have no pleasure in the consort of *Aire*, but endevour to subact it into a more *Dense Body*: But in *Entire Bodies* it is checked; because if the *Aire* should Condense, there is nothing to succeed: Therefore it must be in *loose Bodies*, as *Sand*, and *Powder*; which we see, if they lie close, of themselves gather Moisture.

Experiment Solitary touching *Helps* towards the *Beauty* and *good Features* of *Persons*. 28

IT is reported by some of the *Ancients*; That *Whelps*, or other *Creatures*, if they be put Young, into such a Cage, or Box, as they cannot rise to their Stature, but may increase in Breadth, or length, will grow accordingly, as they can get Roome: which if it be true, and faisible, and that the young *Creature* so pressed, and straightened, doth not thereupon die: It is a Meanes to produce *Dwarfe Creatures*, and in a very Strange figure. This is certaine, and noted long since; That the Presſure or Forming of Parts of Creatures, when they are very young, doth alter the Shape not a little; As the Stroaking of the Heads of Infants, between the Hands, was noted of Old, to make *Macrocephali*; which shape of the Head, at that time, was esteemed. And the Raising gently of the Bridge of the Nose, doth prevent the Deformity of a Saddle Nose. Which observation well weighed, may teach a Meanes, to make the Persons of Men, and Women, in many kindes, more comely, and better featured, than otherwise they would bee; By the Forming and Shaping of them in their Infancy: As by Stroaking up the Calves of the Legges, to keep them from falling downe too low; And by Stroaking up the Forehead to keepe them from being low-foreheaded. And it is a common Practice to swathe Infants, that they may grow more straight, and better shaped: And we see Young Women, by wearing straight Bodies, keepe themselves from being Grosse and Corpulent.

Experiment Solitary touching the *Condensing* of *Aire* in such sort as it may put on *Weight*, and yeeld *Nourishment*. 29

ONions, as they hang, will many of them shoot forth; and so will *Penniroiall*; and so will an Herbe called *Orpin*; with which they use, in the Countrey, to trimme their Houses, binding it to a Lath, or Stick, and setting it against a wall. We see it likewise, more especially, in the greater

Semper-

Semper-vive, which will put out Branches, two or three yeares: But it is true, that commonly they wrap the Root in a Cloth beſmeared with *Oyle*, and renue it once in halfe a Yeare. The like is reported by ſome of the *Ancients*, of the *Stalks of Lillies*. The Cauſe is; For that theſe *Plants* have a Strong, Denſe, and Succulent Moiſture, which is not apt to exhale; And ſo is able, from the old ſtore, without drawing helpe from the Earth, to ſuffice the ſprouting of the *Plant*: And this Sprouting is chiefly in the late Spring, or early Sommer; which are the Times of Putting forth. Wee ſee alſo, that *Stumps* of *Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Conſequence, to try whether theſe things, in the Sprouting, doe increaſe *Weight*; which muſt bee tryed, by weighing them before they be hang'd up; And afterwards againe, when they are ſprouted. For if they increaſe not in *Weight*; Then it is no more but this; That what they ſend forth in the Sprout, they leeſe in ſome other Part: But if they gather *Weight*, then it is *Magnale Naturæ*; For it ſheweth that *Aire* may be made ſo to be Condenſed, as to be converted into a *Denſe Body*; whereas the Race and Period of all things, here above the Earth, is to extenuate and turne things to be more *Pneumaticall*, and Rare; And not to be Retrograde, from *Pneumaticall* to that which is *Denſe*. It ſheweth alſo, that *Aire* can *Nouriſh*; which is another great Matter of Conſequence. Note, that to trie this, the *Experiment* of the *Semper-vive*, muſt be made without Oyling the Cloth; For elſe, it may bee, the *Plant* receiveth Nouriſhment from the Oyle.

Experiment Solitary touching the *Commixture* of *Flame* and *Aire*, and the *great Force* thereof.

30

Flame and *Aire* doe not Mingle, except it be in an *Inſtant*; Or in the *vitall Spirits* of *vegetables*, and *living Creatures*. In *Gunpowder*, the Force of it hath beene aſcribed, to Rarefaction of the Earthy Subſtance into *Flame*; And thus farre it is true: And then (forſooth) it is become another Element; the Forme whereof occupieth more place; And ſo, of Neceſſitie, followeth a Dilatation: And therefore, leſt two Bodies ſhould bee in one place, there muſt needs alſo follow an Expulſion of the Pellet; Or blowing up of the Mine. But theſe are Crude and Ignorant Speculations. For *Flame*, if there were nothing elſe, except it were in very great quantity, will be ſuffocate with any hard Body, ſuch as a Pellet is; Or the Barrell of a Gunn; So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not ſuffer it to kindle, or ſpread. But the Cauſe of this ſo potent a Motion, is the *Nitre*, (which we call otherwiſe *Salt-Petre*;) which having in it a notable Crude and windy *Spirit*, firſt by the *Heat* of the *Fire* ſuddenly dilateth it ſelfe; (And we know that ſimple *Aire*, being preternaturally attenuated by *Heat*, will make it ſelfe Roome, and breake, and blow up that which reſiſteth it;) And Secondly, when the *Nitre* hath dilated it ſelfe, it bloweth abroad the *Flame*, as an inward Bellowes. And therefore we ſee that *Brimſtone*, *Pitch*, *Camphire*, *Wilde-Fire*, & divers other Inflammable Matters, though they burne cruelly, and are hard to quench, Yet they make no ſuch fiery winde, as *Gunpowder* doth: And on the other ſide, we ſee that *Quick-Silver*, (which is a moſt Crude and Watry *Body*) heated, and pent in, hath the like force with *Gunpowder*. As for *living Creatures*, it is certaine, their *Vitall Spirits* are a Subſtance Compounded of an *Airy* and *Flamy* Matter; And though *Aire* and *Flame* being free, will not well mingle; yet bound in by a *Body* that hath ſome fixing, they will. For that you may beſt ſee in thoſe two Bodies, (which are their *Aliments*,) *Water*, and *Oyle*; For they likewiſe will not well mingle of themſelves, but in the Bodies of *Plants*, and

and *Living Creatures*, they will. It is no marvaile therefore, that a ſmall *Quantity* of *Spirits*, in the Cels of the Braine, and Cannals of the Sinewes, are able to move the whole Body, (which is of ſo great Maſſe,) both with ſo great Force, as in Wreſtling, Leaping; And with ſo great Swiftneſſe, as in playing Diviſion upon the *Lute*. Such is the force of theſe two Natures, *Aire* and *Flame*, when they incorporate.

Experiment Solitary touching the *Secret Nature* of *Flame*.

31

TAke a ſmall *Wax Candle*, and put it in a Socket, of Braſſe, or Iron; Then ſet it upright in a Porringer full of *Spirit of Wine*, heated: Then ſet both the *Candle*, and *Spirit of Wine*, on fire, and you ſhall ſee the *Flame* of the *Candle*, open it ſelfe, and become foure or five times bigger than otherwiſe it would have beene; and appeare in Figure *Globular*, and not in *Piramis*. You ſhall ſee alſo, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not wax any whit blew towards the Colour of the Outward *flame* of the *Spirit of Wine*. This is a Noble *Inſtance*; wherein two things are moſt remarkable; The one, that one *Flame* within another quencheth not; but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would ſtill aſcend upwards in one greatneſſe, if it were not quenched on the *Sides*: And the greater the *Flame* is at the Bottome, the higher is the Riſe. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *Water* with *Water*, but onely remaineth contiguous; As it commeth to paſſe betwixt Conſiſting Bodies. It appeareth alſo, that the forme of a Piramis in *Flame*, which we uſually ſee, is meerely by Accident, and that the *Aire* about, by quenching the Sides of the *Flame*, cruſheth it, and extenuateth it into that Forme; For of it ſelfe it would be Round: And therefore *Smoake* is in the Figure of a Piramis Reverſed; For the *Aire* quencheth the *Flame*, and receiveth the *Smoake*. Note alſo, that the *Flame* of the *Candle*, within the *Flame* of the *Spirit of Wine*, is troubled; And doth not only open and move upwards, but moveth waving, and to and fro: As if *Flame* of his owne Nature (if it were not quenched,) would rowle and turne, as well as move upwards. By all which it ſhould ſeeme, that the Cœleſtiall Bodies, (moſt of them,) are true *Fires* or *Flames*, as the *Stoicks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all Globular, and Determinate; They have Rotation; And they have the Colour and Splendour of *Flame*: So that *Flame* above is Durable, and Conſiſtent, and in his Naturall place; But with us, it is a Stranger, and Momentany, and Impure; Like *Vulcan* that halted with his Fall.

Experiment Solitary touching the *Different force* of *Flame* in the *Middeſt* and on the *Sides*.

32

TAke an *Arrow*, and hold it in *Flame*, for the ſpace of ten pulſes; And when it commeth forth, you ſhall finde thoſe Parts of the *Arrow*, which were on the Outſides of the *Flame*, more burned, blacked, and turned almoſt into a Coale; whereas that in the Middeſt of the *Flame*, will be, as if the Fire had ſcarce touched it. This is an *Inſtance* of great conſequence for the diſcovery of the Nature of *Flame*; And ſheweth manifeſtly, that *Flame* burneth more violently towards the Sides, than in the Middeſt: And, which is more, that *Heat* or *Fire* is not violent or furious, but where it is checked and pent. And therefore the *Peripateticks* (howſoever their opinion of an *Element* of *Fire* above the *Aire* is juſtly exploded;) in that Point they acquit themſelves well: For being oppoſed, that if there were a *Spheare* of *Fire*, that incompaſſed the Earth ſo neare hand, it were impoſſible but all things ſhould be burnt up; They anſwer, that the pure *Elementall Fire*, in his owne place, and not irritate, is but of a Moderate *Heat*.

It

Experiment Solitary touching the *Decrease* of the *Naturall motion* of *Gravity* in *great distance from the Earth*; or *within some depth of the Earth*.

33

IT is affirmed constantly by many, as an usuall Experiment; That a *Lump* of *Vre*, in the *Bottome* of a Mine, will be tumbled, and stirred, by two Mens strength; which if you bring it to the *Top* of the *Earth*, will aske Six Mens strength at the least to stirre it. It is a Noble *Instance*, and is fit to be tryed to the full: For it is very probable, that the *Motion of Gravitie* worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Appetite of Union of Dense Bodies with the Earth, in respect of the distance, is more dull; The latter, because the Body hath in part attained his Nature, when it is some Depth in the Earth. For as for the Moving to a *Point* or Place (which was the Opinion of the *Ancient*) it is a meere Vanity.

Experiment Solitary touching the *Contraction* of *Bodies* in *Bulk*, by the *Mixture* of the more *Liquid Body* with the more *Solid*

34

IT is strange, how the *Ancients* tooke up *Experiments* upon credit, and yet did build great Matters upon them. The Observation of some of the best of them, delivered confidently is, That a *Vessell* filled with *Ashes*, will receive the like quantity of *Water*, that it would have done, if it had beene empty. But this is utterly untrue, for the *Water* will not goe in by a Fifth part. And I suppose, that that Fifth part is the difference of the lying close, or open, of the *Ashes*; As wee see that *Ashes* alone, if they be hard pressed, will lie in lesse room: And so the *Ashes* with *Aire* between, lie looser; and with *Water*, closer. For I have not yet found certainly, that the *Water*, it selfe, by mixture of *Ashes*, or *Dust*, will shrinke or draw into lesse Roome.

Experiment Solitary touching the *Making Vines* more *fruitfull*.

35

IT is reported of credit, that if you lay good store of *Kernels* of *Grapes*, about the *Root* of a *Vine*; it will make the *Vine* come earlier and prosper better. It may be tryed with other *Kernels*, laid about the *Root* of a *Plant* of the same kinde; As *Figgs*, *Kernels* of *Apples*, &c. The Cause may be, for that the *Kernels* draw out of the Earth Juice fit to nourish the *Tree*, as those that would be *Trees* of themselves, though there were no *Root*; But the *Root* being of greater strength, robbeth and devoureth the Nourishment, when they have drawne it: As great *Fishes* devoure little.

Experiments in Consort touching *Purging Medicines*.

36

THe *Operation* of *Purging Medicines*, and the Causes thereof, have beene thought to be a great Secret; And so according to the slothfull manner of Men, it is referred to a *Hidden Propriety*, a *Specificall vertue*, and a *Fourth Quality*, & the like Shifts of Ignorance. The *Causes* of *Purging* are divers; all plain and perspicuous; and throughly maintained by Experiēce. The first is, That whatsoever cannot be overcome and disgested by the *Stomack*, is by the *Stomack*, either put up by *Vomit*, or put down to the *Guts*; And by that *Motion* of *Expulsion* in the *Stomack*, & *Guts*, other *Parts of the Bodie*, (as the *Orifices* of the *Veins*, & the like) are moved to expell by *Consent*. For nothing is more frequent than *Motion of Consent* in the Body of Man. This Surcharge of the *Stomack*, is caused either by the *Quality* of the *Medicine*, or by the *Quantity*. The *Qualities* are three: *Extreme Bitter*, as in *Aloes*, *Coloquintida*, &c. *Loathsome* and of horrible taste; As in *Agarick*, *Black Hellebore*, &c. And of *secret Malignity*, & disagreement towards *Mans Body*, many times not appearing much in the Taste; As in *Scammony*, *Mechoacham*, *Antimony*, &c. And note well, that if there be any *Medicine* that *Purgeth*, and hath neither of the first two *Manifest Qualities*; it is to bee held suspected, as a kinde of *Poyson*; For that it worketh either by *Corrosion*; or by a *secret Malignity*, and Enmity to *Nature*: And therefore such *Medicines* are warily to be prepared, and used. The *Quantity* of that which is taken, doth also cause *Purging*; As we see in a great *Quantitie* of *New Milke* from the Cow; yea and a great *Quantitie of Meat*; For

Surfets

Surfets many times turne to *Purges*, both upwards, and downwards. Therefore we see generally, that the working of *Purging Medicines* commeth two or three houres after the *Medicines* taken; For that the *Stomack* first maketh a proofe, whether it can concoct them. And the like happeneth after *Surfets*; Or *Milke* in too great *Quantity*.

A second *Cause* is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery veines*; As it is seene, that *Sal*, or any such thing that is sharp and biting, put into the Fundament, doth provoke the Part to expell; And *Mustard* provoketh Sneezing: And any sharp Thing to the Eyes provoketh Teares. And therfore we see that almost all *Purgers* have a kinde of *Twiching* and *vellication*, besides the *Griping* which commeth of winde. And if this *mordication* be in an over-high Degree, it is little better than the *Corrosion* of *Poyson*; And it commeth to passe sometimes in *Antimony*; Especially if it be given to bodies not repleat with Humours; for where Humours abound, the Humours save the Parts. 37

The third *Cause* is *Attraction*: For I doe not deny, but that *Purging Medicines* have in them a direct Force of *Attraction*; As *Drawing Plaisters* have in *Surgery*: And wee see *Sage*, or *Bettony bruised*, *Sneezing-powder*, and other *Powders* or *Liquours* (which the *Physitians* call *Errhines*,) put into the Nose, draw Flegme, and water from the Head; And so it is in *Apophlegmatismes*, and *Gargarismes*, that draw the Rheume downe by the Pallat. And by this Vertue, no doubt, some *Purgers* draw more one Humour, and some another, according to the opinion received: As *Rubarb* draweth Choller; *Sean* Melancholy; *Agarick* Flegme; &c. But yet, (more or lesse) they draw promiscuously. And note also, that besides Sympathy, between the *Purger* and the *Humour*, there is also another Cause, why some *Medicines* draw some Humour more than another. And it is, for that some *Medicines* worke quicker than others: And they that draw quick, draw onely the Lighter, and more fluide Humours; they that draw slow, worke upon the more Tough, and Viscous Humours. And therefore Men must beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh onely the Lightest part of the Humour away, and leaveth the Masse of Humours more obstinate. And the like may be said of *Worme-wood*, which is so much magnified. 38

The fourth *Cause* is *Flatuositie*; For wine stirred moveth to expell: And wee finde that (in effect) all *Purgers* have in them a raw *Spirit*, or *Winde*; which is the Principall *Cause* of *Tortion* in the *Stomach*, and *Belly*. And therefore *Purgers* leese (most of them) the vertue, by Decoction upon the Fire; And for that Cause are given chiefly in Infusion, Juyce, or Powder. 39

The fift *Cause* is *Compression*, or *Crushing*: As when *Water* is Crushed out of a *Spunge*: So wee see that *Taking Cold* moveth loosenesse by Contracti- of the skin, and outward Parts; And so doth *Cold* likewise cause Rheumes, and Defluxions from the Head; And some *Astringent Plasters* crush out purulent Matter. This kinde of Operation is not found in many *Medicines*: *Mirabolanes* have it; And it may be the *Barkes of Peaches*; For this Vertue requireth an *Astriction*; but such an *Astriction*, as is not gratefull to the Body; (For a pleasing *Astriction* doth rather Binde in the Humours, than Expell them:) And therefore such *Astriction* is found in Things of an Harrish Taste. 40

The Sixth *Cause* is *Lubrefaction*, and *Relaxation*. As wee see in *Medicines Emollient*; Such as are *Milke*, *Honey*, *Mallowes*, *Lettuce*, *Mercuriall*, *Pellitory of the Wall*, and others. There is also a secret Vertue of *Relaxation* in *Cold*: For the *Heat* of the Body bindeth the Parts and Humours together, which 41

Cold,

Cold, relaxeth: As it is seene in *Vrine*, *Bloud*, *Pottage*, or the like; which, if they be *Cold*, Breake, and dissolve. And by this kinde of *Relaxation*, *Feare* looseneth the Belly; because the Heat retiring inwards towards the Heart, the Gutts and other Parts are relaxed; In the same manner as *Feare* also causeth Trembling in the Sinewes. And of this Kinde of *Purgers* are some *Medicines* made of *Mercury*.

42 The Seventh *Cause* is *Abstersion*; which is plainly a *Scouring off*, or *Incision* of the *more viscous Humours*, and making the *Humours* more fluide; And Cutting betweene them, and the Part. As is found in *Nitrous Water*, which scoureth Linnen Cloth (speedily) from the Foulenesse. But this *Incision* must bee by a *Sharpnesse*, without *Astriction:* Which we finde in *Salt*, *Wormewood*, *Oxymel*, and the like.

43 There be *Medicines*, that move *Stooles*, and not *Vrine*; Some other, *Vrine*, and not *Stooles*. Those that *Purge by Stoole*, are such as enter not at all, or little into the *Mesentery Veines*; But either at the first are not digestible by the *Stomach*, and therefore move immediately downwards to the *Gutts*; Or else are afterwards rejected by the *Mesentery Veines*, and so turne likewise downwards to the *Gutts*; and of these two kindes are most *Purgers*. But those that move *Vrine*, are such as are well digested of the *Stomach*, and well received also of the *Mesentery Veines*; So they come as farre as the *Liver*, which sendeth *Vrine* to the *Bladder*, as the *Whey of Bloud*: And those *Medicines* being Opening and Piercing, doe fortifie the Operation of the *Liver*, in sending downe the wheyey Part of the Bloud to the *Reines*. For *Medicines Vrinative* doe not worke by Rejection, and Indigestion, as *Solutive* doe.

44 There bee divers *Medicines*, which in greater *Quantity*, move *Stoole*, and in smaller, *Vrine:* And so contrariwise, some that in greater *Quantitie*, move *Vrine*, and in Smaller, *Stoole*. Of the former sort is *Rubarb*, and some others. The *Cause* is, for that *Rubarb* is a *Medicine*, which the Stomacke in a small Quantity doth digest, and overcome, (being not Flatuous, nor Loathsome;) and so sendeth it to the *Mesentery Veines*; And so being opening, it helpeth downe *Vrine*: But in a greater Quantitie, the *Stomacke* cannot overcome it, and so it goeth to the *Gutts*. *Pepper* by some of the *Ancients* is noted to bee of the second sort; which being in small *Quantity*, moveth winde in the Stomack and Gutts, and so expelleth by *Stoole*; But being in greater *Quantity*, dissipateth the *Wind*; And it selfe getteth to the *Mesentery veines*; And so to the *Liver*, and *Reines*; where, by Heating and Opening, it sendeth downe *Vrine* more plentifully.

Experiments in Consort touching *Meats* and *Drinks* that are *most Nourishing*

45 WE have spoken of *Evacuating* of the *Body*; we will now speake something of the *Filling* of it by *Restoratives* in *Consumptions*, and *Emaciating Diseases*. In *Vegetables*, there is ore Part that is more Nourishing than an other; As *Graines*, and *Roots* nourish more, than the *Leaves*; in so much as the *Order* of the *Foliatanes* was put downe by the *Pope*, as finding Leaves unable to Nourish Mans Bodie. Whether there bee that difference in the Flesh of *Living Creatures*, is not well inquired: As whether *Livers*, and other *Entrails*, be not more Nourishing, than the *Outward Flesh*. We find that amongst the *Romans*, a *Gooses Liver* was a great Delicacy; In so much as they had Artificiall Means to make it faire, and great; But whether it were more Nourishing, appeareth not. It is certaine, that *Marrow* is more Nourishing than *Fat*. And I conceive that some Decoction of *Bones*, and *Sinewes*, stamped, and well strained, would be a very *Nourishing Broth:* Wee finde also that *Scotch Skinck*, (which is a Pottage of strong Nourishment,) is made

made with the *Knees*, and *Sinewes* of *Beefe*, but long boiled: *Ielley* alſo, which they uſe for a Reſtorative, is chiefly made of *Knuckles* of *Veale*. The *Pulp* that is within the *Craſiſh* or *Crab*, which they ſpice and butter, is more Nouriſhing than the *Fleſh* of the *Crab*, or *Craſiſh*. The *Yolkes* of *Egges* are clearly more Nouriſhing than the *Whites*. So that it ſhould ſeeme, that the Parts of *Living Creatures*, that lie more Inwards, nouriſh more than the Outward Fleſh: Except it be the *Braine*; which the Spirits prey too much upon, to leave it any great Vertue of Nouriſhing. It ſeemeth for the Nouriſhing of Aged Men, or Men in Conſumptions, ſome ſuch thing ſhould be Deviſed, as ſhould be halfe *Chylus*, before it be put into the Stomach.

46 Take two large *Capons*; perboyle them upon a ſoft fire, by the ſpace of an houre, or more, till in effect all the Bloud be gone. Adde in the Decoction the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shankes*, and throw them away. Then with a good ſtrong Chopping-knife, mince the two *Capons*, bones and all, as ſmall as ordinary Minced Meat; Put them into a large neat Boulter; Then take a Kilderkin, ſweet, and well ſeaſoned, of foure Gallons of Beere, of 8. s. ſtrength, new as it commeth from the Tunning; Make in the Kilderkin a great Bung hole of purpoſe: Then thruſt into it, the Boulter (in which the *Capons* are) drawne out in length; Let it ſteepe in it three Dayes, and three Nights, the Bung-hole open, to worke; Then cloſe the Bung-hole, and ſo let it continue, a Day and an halfe; Then draw it into bottles, and you may drink it well after 3 dayes Botteling; And it will laſt 6 weekes (approved.) It drinketh freſh, flowreth and mantleth exceedingly; It drinketh not newiſh at all; It is an excellent Drinke for a Conſumption, to be drunke either alone, or Carded with ſome other Beere. It quencheth Thirſt, and hath no whit of windineſſe. Note, that it is not poſſible, that Meat and Bread, either in Broths, or taken with Drink, as is uſed, ſhould get forth into the veins, and outward Parts, ſo finely, and eaſily, as when it is thus Incorporate, and made almoſt a *Chylus* aforehand.

47 Triall would bee made of the like Brew with *Potado Roots*, or *Burr Roots*, or the *Pith* of *Artichoaks*, which are nouriſhing Meats: It may be tryed alſo, with other fleſh; As *Pheſant*, *Partridge*, *Young Porke*, *Pigge*, *Veniſon*, eſpecially of *young Deere*, &c.

48 A *Mortreſſe* made with the *Brawne* of *Capons*, ſtamped, and ſtrained, and mingled (after it is made) with like quantity, (at the leaſt,) of *Almond Butter*; is an excellent Meat to nouriſh thoſe that are weake; Better than *Blanck-Manger*, or *Ielley*: And ſo is the *Cullice* of *Cockes*, boyled thick with the like Mixture of *Almond Butter*: For the *Mortreſſe*, or *Cullice*, of it ſelfe, is more Savory and ſtrong; And not ſo fit for Nouriſhing of weake Bodies; But the *Almonds* that are not of ſo high a taſte as *Fleſh*, doe excellently qualifie it.

49 *Indian Maiz* hath (of certaine,) an excellent Spirit of Nouriſhment; But it muſt be throughly boyled, and made into a *Maiz-Creame* like a *Barley-Creame*. I judge the ſame of *Rize*, made into a Creame; For *Rize* is in *Turky*, and other Countries of the Eaſt, moſt fed upon; But it muſt bee throughly boiled in reſpect of the Hardneſſe of it: And alſo becauſe otherwiſe it bindeth the body too much.

50 *Piſtachoes*, ſo they be good, and not muſty, joyned with *Almonds* in *Almond Milke*; Or made into a *Milk* of themſelves, like unto *Almond Milke*, but more greene, are an excellent Nouriſher. But you ſhall doe well, to adde a little *Ginger*, ſcraped, becauſe they are not without ſome ſubtill windineſſe.

51 *Milke* warme from the Cow, is found to be a great Nouriſher, and a good Remedy in *Conſumptions*: But then you muſt put into it, when you Milke the Cow, two little bagges; the one of *Powder* of *Mint*, the other of *Powder* of *Red Roſes*; For they keepe the *Milke* ſomewhat from Turning, or Crudling in the Stomach; And put in Sugar alſo, for the ſame cauſe, and partly for the Taſts ſake; But you muſt drinke a good draught, that it may ſtay leſſe time in the Stomach, leſt it Cruddle: And let the Cup into which you milke the Cow, be ſet in a greater Cup of hot water, that you may take it warme. And *Cow-milke* thus prepared, I judge to be better for a *Conſumption*, than *Aſſe-milke*, which (it is true) turneth not ſo eaſily, but it is a little harriſh; Marry it is more proper for Sharpneſſe of Urine, and Exulceration of the Bladder, and all manner of Lenifyings. *Womans milke* likewiſe is preſcribed, when all faile; but I commend it not; as being a little too neare the Juyce of Mans Body, to be a good Nouriſher; Except it be in *Infants*, to whom it is Naturall.

52 *Oyle* of *Sweet Almonds*, newly drawne, with *Sugar*, and a little *Spice*, ſpread upon Bread toſted, is an Excellent Nouriſher; But then to keepe the *Oyle* from frying in the Stomach, you muſt drinke a good draught of Milde Beere after it; And to keepe it from relaxing the Stomach too much, you muſt put in a little Powder of Cinnamon.

53 The *Yolkes* of *Egges* are of themſelves ſo well prepared by Nature for Nouriſhment; As (ſo they bee Potched, or Reare boyled) they need no other Preparation, or Mixture; yet they may bee taken alſo raw, when they are new laid, with *Malmeſey*, or *Sweet Wine*; You ſhall doe well to put in ſome few Slices of *Eringium Roots*, and a little *Amber-grice*; For by this meanes, beſides the immediate Facultie of Nouriſhment, ſuch Drinke will ſtrengthen the Back; So that it will not draw down the *Vrine* too faſt; For too much *Vrine* doth alwayes hinder Nouriſhment.

54 *Mincing of Meat*, as in *Pies*, and *Buttered Minced Meat*, ſaveth the Grinding of the Teeth; And therfore, (no doubt) it is more Nouriſhing; Eſpecially in Age; Or to them that have weake Teeth; But the Butter is not ſo proper for weake Bodies; And therefore it were good to moiſten it with a little *Claret Wine*, Pill of *Limon*, or *Orenge*, cut ſmall, *Sugar*, and a very little *Cinnamon*, or *Nutmegg*. As for *Chuetts*, which are likewiſe minced Meat, in ſtead of Butter, and Fat, it were good to moiſten them, partly with *Creame*, or *Almond*, or *Piſtachomilke*; or *Barley*, or *Maiz Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* we reſerve to the due place.

We have hitherto handled the Particulars *which yeeld beſt, and eaſieſt, and plentifulleſt Nouriſhment; And now we will ſpeake of the beſt* Meanes *of Conveying, and Converting the Nouriſhment.*

55 The Firſt *Meanes* is, to procure that the *Nouriſhment* may not bee robbed, and drawne away; wherein that, which we have already ſaid, is very Materiall; To provide, that the *Reines* draw not too ſtrongly an over-great Part of the *Bloud* into *Vrine*. To this adde that Precept of *Ariſtotle*, that *Wine* bee forborne in all *Conſumptions*; For that the *Spirits* of the *Wine*, doe prey upon the Roſcide Juyce of the Body, and inter-common with the Spirits of the Body, and ſo deceive and robbe them of their Nouriſhment. And therefore if the *Conſumption* growing from the weakneſſe of the Stomach, doe force you to uſe *Wine*, let it alwayes be burnt; that the Quicker Spirits may evaporate; or at the leaſt quenched with two little wedges of Gold, 6 or 7 times repeated. Adde alſo this Proviſiõ, that there be not too much *Expence*

of

of the *Nouriſhment*, by *Exhaling*, and *Sweating*: And therefore if the Patient be apt to ſweat, it muſt be gently reſtrained. But chiefly *Hippocrates* Rule is to be followed, who adviſeth quite contrary to that which is in uſe: Namely, that the *Linnen*, or *Garment* next the Fleſh, be in Winter drie, and oft changed; And in Summer ſeldome changed, and ſmeared over with Oyle; For certaine it is, that any Subſtance that is fat, doth a little fill the Pores of the Body, and ſtay Sweat, in ſome Degree. But the more cleanly way is, to have the *Linnen* ſmeared lightly over, with *Oyle* of *Sweet Almonds*; And not to forbeare ſhifting as oft as is fit.

56 The Second *Meanes* is, to ſend forth the *Nouriſhment* into the *Parts*, more ſtrongly; For which, the working muſt bee by *Strengthening* of the *Stomach*; And in this, becauſe the *Stomach* is chiefly comforted by *Wine*, and *Hot things*, which otherwiſe hurt; it is good to reſort to *Outward Applications* to the *Stomach*: Wherein it hath beene tryed, that the *Quilts* of *Roſes*, *Spices*, *Maſtick*, *Wormewood*, *Mint*, &c. are nothing ſo helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sack*, or *Alegant*; And to drie it; And after it be dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the Stomach: For it is certaine, that all Flower hath a potent Vertue of *Aſtriction*; In ſo much as it hardeneth a peece of fleſh, or a Flower, that is laid in it: And therefore a *Bagg* quilted with *Bran*, is likewiſe very good; but it drieth ſomewhat too much; and therefore it muſt not lie long.

57 The Third *Meanes* (which may be a branch of the former) is to ſend forth the *Nouriſhment* the better by *Sleepe*. For we ſee, that Beares, and other *Creatures* that *ſleep* in the Winter, wax exceeding fat: And certaine it is, (as it is commonly beleeved) that *Sleep* doth Nouriſh much; Both for that the Spirits doe leſſe ſpend the Nouriſhment in *Sleep*, than when living *Creatures* are awake: And becauſe (that which is to the preſent purpoſe) it helpeth to thruſt out the Nouriſhment into the Parts. Therefore in Aged men, and weake Bodies, and ſuch as abound not with Choller, a ſhort *Sleep* after dinner doth helpe to Nouriſh; For in ſuch Bodies there is no feare of an overhaſty Digeſtion, which is the Inconvenience of Poſtmeridian *Sleeps*. *Sleepe* alſo in the Morning after the taking of ſomewhat of eaſie Digeſtion; As *Milke* from the Cow, *Nouriſhing Broth*, or the like; doth further Nouriſhment: But this would be done, ſitting upright, that the *Milke* or *Broth* may paſſe the more ſpeedily to the bottome of the Stomach.

58 The Fourth *Meanes* is to provide that the Parts themſelves may draw to them the Nouriſhment ſtrongly. There is an Excellent Obſervation of *Ariſtotle*; That a great reaſon, why plants (ſome of them) are of greater Age, than *Living Creatures*, is, for that they yearly put forth new Leaves, and Boughes; whereas *Living Creatures* put forth (after their Period of Growth,) nothing that is young, but Haire and Nailes, which are Excrements, and no Parts. And it is moſt certaine, that whatſoever is young, doth draw Nouriſhment better, than that which is Old; And then (that which is the Myſterie of that Obſervation) young *Boughes*, and *Leaves*, calling the Sap up to them; the ſame Nouriſheth the *Body*, in the Paſſage. And this we ſee notably proved alſo, in that the oft cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Laſting. Transferre therefore this Obſervation to the Helping of Nouriſhment in *Living Creatures*: The Nobleſt and Principall Uſe whereof is, for the *Prolongation* of *Life*; *Reſtauration* of ſome Degree of *Youth*; and *Inteneration* of the *Parts*: For certain it is, that there are in *Living Creatures* Parts that Nouriſh, and Repaire eaſily; And Parts that

Nouriſh and Repaire hardly; And you muſt refreſh, and renew thoſe that are eaſie to Nouriſh, that the other may be refreſhed, and (as it were) Drink in Nouriſhment, in the Paſſage. Now wee ſee that *Draught Oxen*, put into good Paſture, recover the Fleſh of young Beefe; And Men after long Emaciating Diets, wax plump, and fat, and almoſt new: So that you may ſurely conclude, that the frequent and wiſe Uſe of thoſe *Emaciating Diets*, and of *Purgings*; And perhaps of ſome kinde of *Bleeding*; is a principall Meanes of *Prolongation* of *Life*; & *Reſtoring* ſome Degree of *Youth*: For as we have often ſaid, *Death* commeth upon *Living Creatures* like the Torment of *Mezentius*.

Mortua quinetiam jungebat Corpora vivis,
Componens Manibuſque Manus, atque Oribus Ora.

For the Parts in Mans Body eaſily reparable, (as *Spirits*, *Bloud*, and *Fleſh*) die in the Embracement of the Parts hardly reparable, (as *Bones*, *Nerves*, and *Membranes*;) And likewiſe ſome *Entrails* (which they reckon amongſt the *Spermaticall Parts*) are hard to repaire: Though that Diviſion of *Spermaticall*, and *Menſtruall Parts*, be but a Conceit. And this ſame *Obſervation* alſo may be drawne to the preſent purpoſe of Nouriſhing Emaciated Bodies: And therefore *Gentle Frication* draweth forth the Nouriſhment, by making the Parts a little hungry, and heating them; whereby they call forth Nouriſhment the better. This *Frication* I wiſh to bee done in the Morning. It is alſo beſt done by the *Hand*, or a peece of *Scarlet woull*, wet a little with *Oile* of *Almonds*, mingled with a ſmall Quantitie of *Bay-Salt*, or *Saffron*; We ſee that the very Currying of Horſes doth make them fat, and in good liking.

59 The fifth *Meanes* is, to further the very *Act*, of *Aſſimilation* of *Nouriſhment*; which is done by ſome outward *Emollients*, that make the Parts more apt to *Aſſimilate*. For which I have compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, *vide* the *Receit*. The uſe of it would be betweene Sleeps; For in the latter Sleepe the Parts Aſſimilate chiefly.

Experiment Solitary touching *Fitum Medicinale*.

60 THere bee many *Medicines*, which by themſelves would doe no Cure, but perhaps Hurt; but being applyed in a certaine Order, one after another, doe great Cures. I have tryed (my ſelfe) a *Remedy* for the *Gout*, which hath ſeldome failed, but driven it away in 24. Houres ſpace: It is firſt to apply a *Pultaſſe*; Of which *vide* the *Receit*; And then a *Bath* or *Fomentation*, of which *vide* the *Receit*; And then a *Plaiſter*, *vide* the *Receit*. The *Pultaſſe* relaxeth the Pores, and maketh the Humour apt to Exhale. The *Fomentation* calleth forth the Humour by Vapours; But yet in regard of the way made by the *Pultaſſe*, Draweth gently; And therefore draweth the Humours out; and doth not draw more to it; For it is a *Gentile Fomentation*, and hath withall a Mixture, (though very little) of ſome *Stupefactive*. The *Plaiſter* is a Moderate *Aſtringent Plaiſter*, which repelleth New Humour from falling. The *Pultaſſe* alone would make the Part more ſoft, and weake; And apter to take the Defluxion and Impreſſion of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pultaſſe*, would draw forth little; If too ſtrong, it would draw to the Part, as well as draw from it. The *Plaiſter* alone, would pen the Humour already contained in the Part, and ſo exaſperate it, as well as forbid new Humour. Therefore they muſt be all taken in Order, as is ſaid. The *Pultaſſe* is to bee laid to, for two or three Houres: The *Fomentation* for a Quarter of an Houre, or ſomewhat better, being uſed hot, and ſeven or eight times repeated: The *Plaiſter* to continue on ſtill, till the Part be well confirmed.

There

Experiment Solitary touching *Cure by Cuſtome.* 61

THere is a ſecret Way of *Cure*, (unpractized;) By *Aſſuetude* of that which in it ſelfe hurteth. *Poyſons* have beene made, by ſome, Familiar, as hath beene ſaid. *Ordinary keepers* of the *Sicke* of the *Plague*, are ſeldome infected. *Enduring* of *Tortures*, by *Cuſtome*, hath been made more eaſie: The *Brooking* of Enormous *Quantity* of *Meats*, and ſo of *Wine* or *Strong Drinke*, hath beene, by *Cuſtome*, made to bee without *Surfet*, or *Drunkenneſſe*. And generally *Diſeaſes* that are *Chronicall*, as *Coughes*, *Phthiſickes*, ſome kindes of *Palſeyes*, *Lunacies*, &c. are moſt dangerous at the firſt: Therefore a wiſe *Phyſitian* will conſider whether a *Diſeaſe* bee Incurable; Or whether the Juſt Cure of it bee not full of perill; And if hee finde it to bee ſuch, let him reſort to *Palliation*; And alleviate the *Symptome*, without buſying himſelfe too much with the perfect *Cure*: And many times, (if the *Patient* bee indeed patient,) that Courſe will exceed all Expectation. Likewiſe the *Patient* himſelfe may ſtrive, by little and little, to Overcome the *Symptome*, in the Exacerbation, and ſo, by time, turne Suffering into Nature.

Experiment Solitary touching *Cure by Exceſſe.* 62

DIvers *Diſeaſes*, eſpecially *Chronicall*, (ſuch as *Quartian Agues*;) are ſometimes cured by *Surfet*, and *Exceſſes*: As *Exceſſe of Meat*, *Exceſſe of Drinke*, *Extraordinary Faſting*, *Extraordinary Stirring*, or *Laſſitude*, and the like. The Cauſe is, for that *Diſeaſes* of *Continuance* get an Adventitious Strength from Cuſtome, beſides their *Materiall Cauſe* from the *Humors*: So that the *Breaking* of the *Cuſtome* doth leave them onely to their firſt *Cauſe*; which if it be any thing weak will fall off. Beſides, ſuch *Exceſſes* doe Excite and Spur *Nature*, which thereupon riſeth more forcibly againſt the *Diſeaſe*.

Experiment Solitary touching *Cure by Motion of Conſent.* 63

THere is in the Body of Man a great *Conſent* in the *Motion* of the ſeverall Parts. Wee ſee, it is Childrens ſport, to prove whether they can rubbe upon their Breſt with one hand, and pat upon their Fore-head with another; And ſtraight wayes they ſhall ſometimes rubbe with both Hands, or pat with both hands. Wee ſee, that when the Spirits, that come to the Noſthrils, expell a bad Sent, the Stomach is ready to Expell by Vomit. We finde that in *Conſumptions* of the *Lungs*, when Nature cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they die. So in *Peſtilent Diſeaſes*, if they cannot be expelled by *Sweat*, they fall likewiſe into *Looſeneſſe*, and that is commonly Mortall. Therefore *Phyſitians* ſhould ingeniouſly contrive, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Conſent*: As by the *Stench* of *Feathers*, or the like, they cure the *Riſing* of the *Mother*.

Experiment Solitary touching *Cure* of *Diſeaſes which are contrary to Predispoſition.* 64

HIppocrates *Aphoriſme*, In *Morbis minus*, is a good profound *Aphoriſme*. It importeth, that *Diſeaſes*, contrary to the *Complexion*, *Age*, *Sex*, *Seaſon of the yeare*, *Diet*, &c. are more dangerous than thoſe that are Concurrent. A Man would thinke it ſhould bee otherwiſe; For that, when the *Accident of Sickneſſe*, and the *Naturall Diſpoſition*, doe ſecond the one the other, the *Diſeaſe* ſhould bee more forcible: And ſo (no doubt) it is; if you ſuppoſe like *Quantity* of *Matter*. But that which maketh good the *Aphoriſme*, is, Becauſe ſuch *Diſeaſes* doe ſhew a greater *Collection of Matter*, by that they are able to overcome thoſe *Naturall Inclinations* to the Contrary. And therefore in *Diſeaſes* of that kinde, let the *Phyſitian* apply himſelfe more to *Purgation*, than to *Alteration*; Becauſe the offence is in the *Quantity*; and the *Qualities* are rectified of themſelves.

Experiment Solitary touching *Preparations* before *Purging*, and *setling* of the *Body* afterward 65

Physitians do wisely prescribe, that there bee *Preparatives* used before *Iust Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body bee not accommodated, both before, and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the Sticking of the Humours, and their not comming faire away; Which causeth in the Bodie great Perturbations, and ill Accidents, during the *Purging*; And also, the diminishing, and dulling of the Working of the *Medicine* it selfe, that it purgeth not sufficiently; Therefore the worke of *Preparation* is double; to make the *Humours fluide*, and mature; And to make the *Passages* more open: For both those helpe to make the Humours passe readily. And for the former of these, *Sirrups* are most profitable; And for the Latter, *Apozumes*, or *Preparing Broths*; *Clisters* also helpe lest the *Medicine* stop in the Guts, and worke gripingly. But it is true, that *Bodies abounding* with *Humours*; And *fat Bodies*; And *Open Weather*; are *Preparatives* in themselves; because they make the Humours more fluide. But let a *Physitian* beware, how hee purge after hard *Frosty Weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is caused by the *Lodging* of some *Humours* in *ill Places*: For it is certaine, that there bee *Humours*, which somewhere placed in the Body, are quiet, and doe little hurt; In other Places, (especially Passages,) do much mischiefe. Therefore it is good, after *Purging*, to use *Apozumes*, and *Broths*, not so much *Opening* as those used before *Purging*, but *Abstersive* and *Mundifying Clisters* also are good to conclude with, to draw away the Reliques of the Humors, that may have descended to the *Lower Region* of the *Bodie*.

Experiment Solitary touching *Stanching of Bloud*. 66

Bloud is stanched divers wayes. First by *Astringents*, and *Repercussive Medicines*. Secondly by *Drawing* of the *Spirits* and *Bloud inwards*; which is done by *cold*; As *Iron* or a *Stone* laid to the neck doth stanch the Bleeding at the Nose; also it hath been tryed, that the *Testicles* being put into sharp Vineger, hath made a suddaine Recesse of the Spirits, and stanched Bloud. Thirdly by the *Recesse of the bloud by Sympathy*. So it hath beene tryed, that the part that bleedeth, being thrust into the Body of a Capon, or Sheepe, new ript and bleeding, hath stanched *Bloud*; The *Bloud*, as it seemeth, sucking & drawing up, by similitude of substance, the *Bloud* it meeteth with, and so it selfe going backe. Fourthly by Custome and Time; So the Prince of *Aurange*, in his first hurt, by the *Spanish Boy*, could finde no meanes to stanch the *Bloud*, either by *Medicine* or *Ligament*; but was faine to have the *Orifice* of the *Wound* stopped by *Mens Thumbs*, succeeding one another, for the space at the least of two Dayes; And at the last the bloud by *Custome* onely retired. There is a fifth Way also in use, to let *Bloud* in an *Adverse Part*, for a *Revulsion*.

Experiment Solitary touching *Change* of *Aliments* and *Medicines*. 67

It helpeth, both in *Medicine*, and *Aliment*, to Change and not to continue the same *Medicine* and *Aliment* still. The Cause is, for that *Nature* by continuall Use of any Thing, groweth to a *Satietie*, and *Dulnesse*, either of *Appetite*, or *Working*. And we see that *Assuetude* of *Things Hurtfull* doth make them leese their force to Hurt; As *Poyson*, which with use some have brought themselves to brook. And therefore it is no marvaile, though *Things helpfull* by *Custome*, leese their force to Helpe, I count *Intermission* almost the same thing with *Change*; For that, that hath beene intermitted, is after a sort new.

IT is found by Experience, that in *Diets of Guaiacum*, *Sarza*, and the like (especially if they be strict,) the *Patient* is more troubled in the beginning, than after continuance; Which hath made some of the more delicate Sort of patients, give them over in the middest; Supposing that if those Diets trouble them so much at first, they shall not be able to endure them to the End. But the Cause is, for that all those *Diets*, doe drie up *Humours*, *Rheumes*, and the like; And they cannot Drie up untill they have first attenuated; And while the *Humour* is attenuated, it is more Fluid, than it was before, and troubleth the Body a great deale more, untill it bee dried up, and consumed. And therefore *Patients* must expect a due time, and not check at them at the first.

Experiment Solitary touching *Diets*. 68

THe *Producing* of *Cold* is a thing very worthy the Inquisition; both for Use, and Disclosure of Causes. For *Heat* and *Cold* are *Natures* two hands, whereby she chiefly worketh: And *Heat* we have in readinesse, in respect of the *Fire*; But for *Cold* we must stay till it commeth; or seeke it in deep Caves, or high Mountaines: And when all is done, wee cannot obtaine it in any great degree: For *Furnaces* of *Fire* are farre hotter, than a *Summers Sunne*; But *Vaults* or *Hils* are not much Colder than a *Winters Frost*.

Experiments in Consort touching the *Production* of *Cold*.

69 The first *Meanes* of *Producing Cold*, is that which *Nature* presenteth us withall; Namely the *Expiring* of *cold* out of the *Inward Parts of the Earth* in *Winter*, when the Sunne hath no power to overcome it; the *Earth* being (as hath been noted by some) *Primum Frigidum*. This hath been asserted, as well by Ancient, as by Moderne *Philosophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Author* of the discourse in *Plutarch*, (for I take it, that booke was not *Plutarchs* owne) *De primo Frigido*. It was the opinion of *Telesius*, who hath renewed the *Philosophie* of *Parmenides*, and is the best of the *Novelists*.

70 The second *Cause* of *Cold* is the *Contact* of *Cold Bodies*; For *Cold* is Active and Tranitive into Bodies Adjacent, as well as *Heat*: which is seen in those things that are touched with *Snow* or *Cold water*. And therefore, whosoever will bee an *Inquirer* into *Nature*, let him resort to a *Conservatory* of *Snow* and *Ice*; Such as they *use for delicacy*, to coole Wine in Summer: Which is a Poore and Contemptible use, in respect of other uses, that may bee made of such *Conservatories*.

71 The Third *Cause* is the *Primary Nature* of all *Tangible Bodies*: For it is well to bee noted, that all Things whatsoever (*Tangible*) are of themselves *Cold*; Except they have an Accessory *Heat* by *fire*; *Life*; or *Motion*: For even the *Spirit* of *Wine*, or *Chymicall Oyles*, which are so hot in Operation, are to the first Touch, *Cold*; And *Aire* it selfe compressed, and Condensed a little by blowing, is *Cold*.

72 The Fourth *Cause* is the *Density of the Body*; For all *Dense Bodies* are *Colder* than most other *Bodies*; As *Mettals*, *Stone*, *Glasse*; and they are longer in *Heating* than *Softer Bodies*. And it is certaine, that *Earth*, *Dense*, *Tangible*, hold all of the Nature of *Cold*. The Cause is, for that all *Matters Tangible* being *Cold*, it must needs follow, that where the *Matter* is most Congregate, the *Cold* is the greater.

The

73 The Fifth *Cauſe* of *Cold*, or rather of increaſe and vehemency of *Cold*, is a *Quick Spirit incloſed in a Cold Body*: As will appeare to any that ſhall attentively conſider of *Nature* in many Inſtances. Wee ſee *Nitre* (which hath a *Quick Spirit*) is Cold; more *Cold* to the Tongue, than a Stone; So *Water* is *Colder* than *Oile*, becauſe it hath *a Quicker Spirit*; For all *Oile*, though it hath the Tangible Parts better digeſted than *Water*, yet hath it a duller *Spirit*: So *Snow* is *Colder* than *Water*, becauſe it hath *more Spirit* within it: So wee ſee that *Sali* put to *Ice* (as in the producing of the *Artificiall Ice*) increaſeth the *Activity* of *Cold*: So ſome *Inſecta* which have *Spirit* of *Life*, as *Snakes*, and *Silkwormes*, are to the touch, *Cold*. So *Quick-ſilver* is the *Coldeſt* of Metals, becauſe it is *fulleſt of Spirit*.

74 The Sixth *Cauſe* of *Cold* is *the Chaſing and Driving away of Spirits*, ſuch as have ſome *Degree of Heat*: For the Baniſhing of the *Heat* muſt needs leave any Body *Cold*. This wee ſee in the Operation of *Opium*, and *Stupefactives*, upon the Spirits of living Creatures: And it were not amiſſe to trie *Opium*, by laying it upon the Top of a *Weather-glaſſe*, to ſee whether it will contract the *Ayre*: But I doubt it will not ſucceed: For beſides that the vertue of *Opium* will hardly penetrate thorow ſuch a Body as Glaſſe, I conceive that *Opium*, and the like, make the *Spirits* flie rather by *Malignity*, than by *Cold*.

75 Seventhly, the ſame *Effect* muſt follow upon the *Exhaling or Drawing out of the warme Spirits*, that doth upon the Flight of the Spirits. There is an Opinion, that the *Moone* is Magneticall of *Heat*, as the *Sunne* is of *Cold* and *Moiſture*: It were not amiſſe therefore to trie it, with *Warme-waters*; The one expoſed to the Beames of the *Moone*; the other with ſome Skreene betwixt the Beames of the *Moone* and the *water*; As wee uſe to the *Sunne* for Shade; And to ſee whether the former will coole ſooner. And it were alſo good to inquire, what other Meanes there may bee, to draw forth the *Exile heat*, which is in the *Aire*; for that may be a Secret of great Power to Produce *Cold weather*.

Experiments in Conſort touching the *Verſion* and *Tranſmutation of Aire into water*.

WEE have formerly ſet down the *Meanes of turning Aire into water*, in the *Experiment* 27. But becauſe it is *Magnale Naturæ*; and tendeth to the ſubduing of a very great effect; And is alſo of Manifold uſe; wee will adde ſome *Inſtances* in *Conſort* that give light thereunto.

76 It is reported by ſome of the *Ancients*, that *Sailers* have uſed, every Night, to hang *Fleeces of Wooll* on the ſides of their *Ships*, the *Wooll* towards the water; And that they have cruſhed freſh Water out of them, in the Morning, for their uſe. And thus much we have tryed, that a *Quantitie* of *Wooll* tyed looſe together, being let downe into a deepe *Well*; And hanging in the *Middle*, ſome three Fathome from the water, for a night, in the Winter time; increaſed in weight, (as I now remember) to a fifth Part.

77 It is reported by one of the *Ancients*, that in *Lydia*, neare *Pergamus*, there were certaine *Work-men*, in time of *Wars* fled into *Caves*; And the Mouth of the *Caves* being ſtopped by the Enemies, they were famiſhed. But long time after the dead Bones were found; And ſome Veſſels which they had carried with them; And the Veſſels full of *Water*; And that *Water*, thicker, and more towards Ice, than Common *Water*: which is a Notable Inſtance of *Condenſation*, and *Induration* by *Buriall under Earth*, (in Caves) for long time; And of *verſion* alſo (as it ſhould ſeeme,) of *Aire* into *Water*;

if

if any of those vessels were Empty. Trie therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like in *Quick-silver*: And if you finde the *Bladders* fallen, or shrunke; you may bee sure the *Aire* is condensed by the *Cold* of those *Bodies*; As it would bee in a *Cave* under *Earth*.

It is reported of very good credit, that in the *East-Indies*, if you set a Tub of *Water* open in a Roome where *Cloves* are kept, it will bee drawne drie in 24. houres; Though it stand at some distance from the *Cloves*. In the Countrey, they use many times, in deceit, when their *Wooll* is new shorne, to set some Pailes of *Water* by, in the same Roome; to increase the weight of the *Wooll*. But it may bee, that the Heat of the *Wooll*, remaining from the body of the Sheepe; or the Heat gathered by the lying close of the *Wooll*, helpeth to draw the watry Vapour; But that is nothing to the *Version*. 78

It is reported also credibly, that *Wooll* new shorne, being laid casually upon a *Vessell* of *Verjuyce*, after some time, had drunke up a great part of the *Verjuyce*, though the Vessell were whole without any *Flaw*, and had not the Bung-hole open. In this *Instance*, there is (upon the by) to be noted, the *Percolation*, or *Suing* of the *Verjuyce* through the wood; For *Verjuyce* of it selfe would never have passed thorow the wood: So as, it seemeth, it must bee first in a kinde of Vapour, before it passe. 79

It is especially to be noted, that the Cause, that doth facilitate the *Version* of *Aire* into *Water*, when the *Aire* is not in grosse, but subtilly mingled with *Tangible Bodies*, is, (as hath beene partly touched before,) for that *Tangible Bodies* have an Antipathy with *Aire*; and if they finde any *Liquid Body*, that is more dense, neare them, they will draw it: And after they have drawne it, they will condense it more, and in effect incorporate it; For wee see that a *Spunge*, or *Wooll*, or *Sugar*, or a *woollen cloth*, being put but in part, in *Water*, or *Wine*, will draw the *Liquor* higher, and beyond the place: where the *water* or *wine* commeth. Wee see also, that *Wood*, *Lute-strings*, and the like, doe swell in *moist Seasons*: As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth of Boxes*, and *Opening* of *Wainscot doores*; which is a kinde of *Infusion*: And is much like to an *Infusion* in water, which will make wood to swell: As we see in the Filling of the Chops of Boules, by laying them in water. But for that part of these *Experiments*, which concerneth *Attraction*, wee will reserve it to the proper *Title* of *Attraction*. 80

There is also a *Version of Aire into water*, seene in the *Sweating* of *Marbles*, and other *Stones*. And of *Wainscot* before and in moist weather: This must be, either by some *Moysture* the Body yeeldeth; Or else by the Moist Aire thickned against the hard body. But it is plaine, that it is the latter; For that wee see *Wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *Wood* alone: which is caused by the Smoothnesse and Closenesse, which letteth in no part of the Vapour, and so turneth it backe, and thickeneth it into Dew. Wee see also, that *Breathing* upon a *Glasse*, or Smooth body, giveth a Dew; And in *Frosty Mornings* (such as we call *Rime frosts*) you shall finde drops of Dew upon the Inside of Glasse-windowes; And the *Frost* it selfe upon the ground, is but a *Version* or *Condensation*, of the Moist vapours of the Night, into a watry substance: *Dewes* likewise, and *Raine*, are but the Returnes of Moist vapours Condensed; The Dew, by the *Cold* onely of the Sunnes departure, which is the gentler *Cold*; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Aire*; which is the more violent *Cold*. 81

It is very probable (as hath beene touched) that that, which will turne 82

Water

Water into *Ice*, will likewise turne *Aire* some Degree nearer unto *Water*. Therfore trie the *Experiment* of the *Artificiall Turning Water into Ice* (whereof we shall speake in another place) with *Aire* in place of *Water*, and the *Ice* about it. And although it bee a greater Alteration to turne *Aire* into *Water*, than *Water* into *Ice*: Yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow; For that Artificiall *Conversion* of *Water* into *Ice*, is the worke of a few Houres; And this of *Aire* may be tried by a Moneths space, or the like.

Experiments in Consort touching *Induration of Bodies.*

Induration, or *Lapidification*, of Substances more soft, is likewise another degree of *Condensation*; And is a great *Alteration* in Nature. The Effecting and Accelerating thereof is very worthy to bee inquired. It is effected by three Meanes. The first is by *Cold*; whose Propertie is to *Condense*, and constipate, as hath beene said. The Second is by *Heat*; which is not proper but by consequence; For the *Heat* doth attenuate; And by Attenuation doth send forth the Spirit and moister Part of a Body; And upon that, the more grosse of the Tangible Parts doe contract and serre themselves together; Both to avoid *Vacuum* (as they call it;) And also to Munite themselves against the Force of the *Fire*, which they have suffered. And the Third is by *Assimilation*; when a Hard Body Assimilateth a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiscuously, are many: As the Generation of *Stones* within the Earth, which at the first are but Rude Earth, or Clay: And so of *Minerals*, which come (no doubt) at first, of Juyces Concrete, which afterward indurate: And so of *Porcellane*, which is an *Artificiall Cement*, buried in the Earth a long time: And so the Making of *Bricke*, and *Tile*: Also the Making of *Glasse*, of a certain Sand, and Brake-Roots, and some other Matters: Also the *Exudations* of *Rock-Diamonds*, and *Crystall*, which harden with time: Also the *Induration* of *Bead-Amber*, which at first is a soft Substance; As appeareth by the *Flies*, and *Spiders*, which are found in it; And many more: But we will speak of them distinctly.

83 For *Indurations* by *Cold*, there be few Trials of it; For we have no strong or intense *Cold* here on the Surface of the *Earth*, so neare the Beames of the Sunne, and the Heavens. The likeliest Triall is by *Snow*, and *Ice*; For as *Snow* and *Ice*, especially being holpen, and their *Cold* activated by *Nitre*, or *Salt*, will turne *Water* into *Ice*, and that in a few houres; So it may be, it will turne *Wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conserving Pit* of *Snow*, and *Ice*, (adding some quantity of *Salt*, and *Nitre*,) a Peece of *Wood*, or a Peece of *Tough Clay*, and let it lie a moneth, or more.

84 Another Triall is by *Metalline Waters*, which have virtuall *Cold* in them.

Put

Put therefore *Wood*, or *Clay*, into *Smiths water*, or other *Metalline water*; And try whether it will not harden in some reasonable time. But I understand it, of *Metalline Waters*, that come by Washing, or Quenching; And not of *Strong Waters* that come by dissolution; for they are too Corrosive to consolidate.

It is already found, that there are some *Naturall Spring-waters*, that will Inlapidate *Wood*; So as you shall see one peece of *Wood*, whereof the Part above the *Water* shall continue *Wood*; And the Part under the *Water* shall be turned into a kinde of *Gravelly Stone*. It is likely those *Waters* are of some *Metalline Mixture*; But there would bee more particular Inquiry made of them. It is certaine, that an *Egge* was found, having lien many yeares in the bottome of a Moat, where the Earth had somewhat overgrowen it; And this Egge was come to the Hardnesse of a *Stone*; And had the Colours of the white and yolke perfect: And the Shell shining in small graines like Sugar, or Alablaster. 85

Another Experience there is of *Induration* by *Cold*, which is already found; which is, that *Metalls*, themselves are hardened by often *Heating* and *Quenching* in *Cold water*: For *Cold* ever worketh most potently upon *Heat* precedent. 86

For *Induration* by *Heat*, it must be considered, that *Heat*, by the Exhaling of the Moister Parts, doth either harden the Bodie; As in *Bricks*, *Tiles*, &c; Or if the *Heat* be more fierce, maketh the grosser Part it selfe, Runne and Melt; As in the making of ordinary *Glasse*; And in the *Vitrification* of *Earth*, (As we see in the Inner Parts of *Furnaces*;) And in the *Vitrification* of *Bricke*; And of *Metals*. And in the former of these, which is the Hardening by baking, without Melting, the *Heat* hath these degrees; First, it *Indurateth*; and then maketh *Fragile*; And lastly it doth *Incinerate* and *Calcinate*. 87

But if you desire to make an *Induration* with *Toughnesse*, and lesse Fragilitie; A middle way would be taken; Which is that which *Aristotle* hath well noted; But would be throughly verified. It is, to decoct *Bodies* in *Water*, for two or three dayes; But they must bee such bodies, into which the *Water* will not enter; As *Stone*, and *Metall*. For if they bee Bodies into which the *Water* will enter, then long Seething, will rather Soften than indurate them; As hath beene tryed in *Egges*, &c. Therefore, Softer *Bodies* must be put into Bottles; And the Bottles hung into Water seething, with the mouths open, above the *Water*; that no *Water* may get in; For by this Meanes, the virtuall *Heat* of the *Water* will enter; And such a *Heat*, as will not make the Body aduſt, or fragile; But the Substance of the *Water* will be shut out. This *Experiment* we made; and it sorted thus. It was tryed with a peece of *Free-Stone*, and with *Pewter*, put into the *Water* at large. The *Free-Stone* we found received in some *Water*; For it was softer, and easier to scrape, than a peece of the same *Stone* kept drie. But the *Pewter* into which no *Water* could enter, became more white, and liker to Silver, and lesse flexible, by much. There were also put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Peece of *Cheese*, a Peece of *Chalke*, and a Peece of *Free-Stone*. The *Clay* came forth almost of the Hardnesse of *Stone*; The *Cheese* likewise very hard, and not well to be cut: The *Chalke* and the *Free-Stone* much harder than they were. The colour of the *Clay* inclined not a whit to the Colour of *Brick*, but rather to white, as in ordinary Drying by the Sunne. Note, that all the former Trials were made by a Boyling upon a good hot Fire, renewing the *Water* as it consumed, with other hot *Water*; But the Boyling 88

was

was but for twelve houres onely; And it is like that the Experiment would have beene more effectuall, if the Boyling had been for two or three dayes, as we prescribed before.

89 As touching *Assimilation*, (for there is a degree of *Assimilation* even in Inanimate bodies) wee see Examples of it in some *Stones* in *Clay-Grounds*, lying neare to the top of the Earth, where *Pebble* is; In which you may manifestly see divers *Pebbles* gathered together, and a Crust of *Cement* or *Stone* between them, as hard as the *Pebbles* themselves: And it were good to make a Triall of purpose, by taking *Clay*, and putting in it divers *Pebble Stones*, thicke set, to see whether in continuance of time, it will not bee harder than other *Clay* of the same lumpe, in which no *Pebbles* are set. Wee see also in Ruines of old Wals, especially towards the Bottome, the *Morter* will become as hard as the *Brick*; wee see also, that the *Wood* on the sides of *Vessels* of *Wine*, gathereth a Crust of *Tartar*, harder than the *Wood* it selfe; And Scales likewise grow to the *Teeth*, harder than the *Teeth* themselves.

90 Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees*, and *living Creatures*: For no Nourishment that the *Tree* receiveth, or that the *living Creature* receiveth, is so hard as *Wood*, *Bone*, or *Horne*, *&c.* but is *Indurated* after by *Assimilation*.

Experiment Solitary touching the *Version of water into Aire.*

91 THe Eye of the understanding, is like the Eye of the Sense: For as you may see great Objects through small Crannies, or Levels: So you may see great *Axiomes* of *Nature*, through small and Contemptible *Instances*. The *Speedy Depredation* of *Aire* upon *watry Moisture*, and *Version* of the same into *Aire*, appeareth in nothing more visible, than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breath*, or *Vapour*, from *Glasse*, or the *Blade* of a *Sword*, or any such Polished Body; Such as doth not at all Detaine, or Imbibe the Moisture; For the Mistinesse scattereth and breaketh up suddenly. But the like *Cloud*, if it were *Oyle*, or *Fatty*, will not discharge; Not because it sticketh faster; But because *Aire* preyeth upon *Water*; And *Flame*, and *Fire*, upon *Oyle*; And therefore, to take out a Spot of Grease, they use a *Coale* upon browne Paper; Because *Fire* worketh upon Grease, or *Oyle*, as *Aire* doth upon *Water*. And wee see *Paper oyled*, or *Wood oyled*, or the like, last long moist; but *Wet* with *Water*, drie, or putrifie sooner. The Cause is, for that *Aire* medleth little with the *Moisture* of *Oyle*.

Experiment Solitary touching the *Force of Vnion.*

92 THere is an Admirable demonstration, in the same trifling *Instance* of the *little Cloud* upon *Glasse*, or *Gemmes*, or *Blades* of *Swords*, of the *Force of Vnion*, even in the least Quantities, and weakest Bodies, how much it conduceth to Preservation of the present Forme; And the Resisting of a New. For marke well the discharge of that *Cloud*; And you shall see it ever break up, first in the Skirts, and last in the middest. We see likewise, that much *Water* draweth forth the Juyce of the Body Infused; But little water, is imbibed by the Body: And this is a Principall Cause, why in Operation upon *Bodies*, for their *Version* or *Alteration*, the Triall in great Quantities, doth not answer the Triall in small; And so deceiveth many; For that (I say) the greater Body, resisteth more any Alteration of Forme, and requireth farre greater Strength in the Active Body, that should subdue it.

Experiment Solitary touching the *Producing of Feathers and Haires of divers Colours.*

93 WE have spoken before, in the fifth *Instance*, of the Cause of *Orient Colours*, in *Birds*; Which is by the Fineness of the Strainer; wee will now endevour to reduce the same *Axiome* to a *Worke*. For this Writing

ting of our *Sylva Sylvarum*, is (to speake properly) not *Naturall History*, but a high kinde of *Naturall Magicke*. For it is not a Description onely of Nature, but a Breaking of Nature, into great and strange Workes. Trie therefore, the Anointing over of *Pigeons*, or other *Birds*, when they are but in their Downe; Or of *whelps*, cutting their Haire as short as may bee; Or of some other Beast; with some oyntment, that is not hurtfull to the Flesh; And that will harden, and stick very close; And see whether it will not alter the Colours of the *Feathers*, or *Haire*. It is received, that the *Pulling* off, the first *Feathers* of *Birds*, cleane, will make the new come forth *White*: And it is certaine, that *White* is a penurious Colour, and where moisture is scant. So *Blew Violets*, and other *Flowers*, if they be starved, turne Pale and *White*; *Birds*, and *Horses*, by Age, or Scarres, turne *White*: And the *Hoare Haires* of Men, come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that come first, will be many times of divers Colours, according to the Nature of the *Bird*; For that the Skinne is more porous; But when the Skin is more shut, and close, the Feathers will come *White*. This is a good *Experiment*, not onely for the Producing of *Birds* and *Beasts* of strange Colours, but also, for the Discloſure of the Nature of *Colours* themselves; which of them require a finer Porositie, and which a grosser.

Experiment Solitary touching *the Nourishment of Living Creatures before they be brought forth.* 94

IT is a worke of Providence, that hath beene truly observed by some; That the *Yolke* of the *Egge*, conduceth little to the *Generation* of the *Bird*; But onely to the *Nourishment* of the same: For if a *Chicken* be opened, when it is new hatched; you shall finde much of the *Yolke* remaining. And it is needfull, that *Birds*, that are shaped without the Females Wombe, have in the *Egge*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egge* is laid, and severed from the Body of the *Hen*; It hath no more Nourishment from the *Hen*; But onely a quickning *Heat* when shee sitteth. But Beasts, and Men need not the matter of Nourishment within themselves; Because they are shaped within the Wombe of the Female, and are Nourished continually from her Body.

Experiments in Consort touching *Sympathy and Antipathy for Medicinall use.* 95

IT is an Inveterate and received Opinion, that *Cantharides* applyed to any Part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Received, that a kinde of *Stone*, which they bring out of the *West Indies*, hath a peculiar force to move Gravell, and to dissolve the *Stone*; In so much, as laid but to the Wrest, it hath so forcibly sent downe Gravell, as Men have beene glad to remove it; It was so violent.

96

It is received and confirmed by daily Experience, that the *Soales* of the *Feet* have great Affinity with the *Head*, and the *Mouth* of the *Stomach*: As wee see, *Going wet-shod*, to those that use it not, affecteth both: Applications of *hot Powders* to the *Feet* attenuate first, and after drie the *Rheume*: And therefore a *Physitian*, that would be Mysticall, prescribeth, for the Cure of the *Rheume*, that a Man should walke Continually upon a *Camomill Alley*; Meaning, that he should put *Camomill* within his Sockes. Likewise *Pigeons bleeding*, applyed to the *Soales* of the *Feet*, ease the *Head*: And *Soporiferous Medicines* applyed unto them, provoke *Sleepe*.

97

It seemeth, that as the *Feet* have a Sympathy with the *Head*; So the *Wrests* and *Hands*, have a Sympathy with the *Heart*; Wee see the Affects and Passions of the *Heart*, and *Spirits*, are notably discloſed by the *Pulse*: And it is often tried, that Juyces of *Stock-Gilly-Flowers*, *Rose-Campian*, *Garlicke*, and other things; applyed to the *Wrests*, and renewed; have cured long *Agues*.

And I conceive, that washing with certaine *Liquours*, the *Palmes* of the *Hands*, doth much good: And they doe well in *Heats* of *Agues*, to hold in the Hands, *Egges* of *Alablaster*, and *Balls* of *Crystall*.

Of these things we shall speake more, when wee handle the Title *of* Sympathy *and* Antipathy, *in the proper Place.*

Experiment Solitary touching the *Secret Processes of Nature.*

98

THe Knowledge of man (hitherto) hath been determined by the View, or Sight; So that whatsoever is Invisible, either in respect of the *Fineness of the Body* it selfe; Or the *Smallness of the Parts*; Or of the *Subtiltie of the Motion*; is little inquired. And yet these be the Things that Governe Nature principally; And without which, you cannot make any true *Analysis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumaticals*, that are in all *Tangible Bodies*, are scarce knowne. Sometimes they take them for *Vacuum*; whereas they are the most Active of Bodies. Sometimes they take them for *Aire*; From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will have them to be *Naturall Heat*, or a *Portion* of the *Element of Fire*; Whereas some of them are crude, and cold. And sometimes they will have them to bee the *Vertues* and *Qualities* of the *Tangible Parts*, which they see; whereas they are Things by themselves. And then, when they come to Plants and living Creatures, they call them *Soules*. And such Superficiall Speculations they have; Like Prospectives, that shew things inward, when they are but Paintings. Neither is this a Question of Words, but infinitely materiall in *Nature*. For *Spirits* are nothing else but a *Naturall Body*, rarified to a Proportion, and included in the *Tangible Parts* of *Bodies*, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoever, more or lesse: And they are never (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *Putrefaction*, *Vivification*, and most of the Effects of *Nature*: For, as we have figured them in our *Sapientiâ Veterum*, in the *Fable* of *Proserpina*, you shall in the Infernall Regiment heare little Doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in *Bodies* are Stupide things; And the *Spirits* doe (in effect) all. As for the differences of *Tangible Parts* in *Bodies*, the industry of the *Chymists* hath given some light, in discerning by their Separations, the *Oyly*, *Crude*, *Pure*, *Impure*, *Fine*, *grosse Parts* of *Bodies*, and the like. And the *Physitians* are content to acknowledge, that *Herbs* and *Drugs* have divers Parts; As that *Opium* hath a Stupefactive Part, and a Heating Part; The one moving Sleepe, the other a Sweat following; And that *Rubarb* hath Purging Parts, and Astringent Parts, &c. But this whole *Inquisition* is weakly and Negligently handled. And for the more subtill differences of the *Minute Parts*, and the Posture of them in the Body, (which also hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts of Bodies*, which doe so great Effects, they have not beene observed at all; because they are Invisible, and incurre not to the Eye; but yet they are to be deprehended by Experience: As *Democritus* said well, when they charged him to hold, that the World was made of such little Moats, as were seene in the Sunne; *Atomus* (saith he) *necessitate Rationis & Experientiæ esse convincitur*; *Atomum enim nemo unquam vidit*. And therefore the Tumult in the Parts of Solide Bodies, when they are compressed, which is the Cause of all *Flight* of Bodies thorow the Aire, and of other *Mechanicall Motions*, (as hath beene partly touched before, and shall be throughly handled in due place,) is not seene

at

at all. But nevertheleſſe, if you know it not, or enquire it not attentively and diligently, you ſhall never be able to diſcerne, and much leſſe to produce, a Number of *Mechanicall Motions*. Againe, as to the *Motions Corporall*, within the Encloſures of Bodies, whereby the Effects (which were mentioned before) paſſe between the *Spirits*, and the *Tangible Parts*, (which are, *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, &c.) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Paſſions*, and ſuch other *Logicall* Words.

Experiment Solitary touching the *Power of Heat*. 99

IT is certaine, that of all *Powers* in *Nature*, *Heat* is the chiefe; both in the Frame of *Nature*, and in the workes of *Art*. Certaine it is likewiſe, that the Effects of *Heat*, are moſt advanced, when it worketh upon a Body, without loſſe or diſſipation of the Matter; for that ever betrayeth the Account. And therefore it is true, that the power of *Heat* is beſt perceived in *Diſtillations*, which are performed in cloſe Veſſels, and Receptacles. But yet there is a higher Degree; For howſoever *Diſtillations* doe keepe the Body in Cells, and Cloyſters, without Going abroad, yet they give ſpace unto Bodies to turne into Vapour; To returne into Liquour; And to Separate one part from another. So as *Nature* doth Expatiate, although it hath not full Liberty: Whereby the true and Ultime Operations of *Heat* are not attained. But if *Bodies* may be altered by *Heat*, and yet no ſuch Reciprocation of *Rarefaction*, and of *Condenſation*, and of *Separation*, admitted; then it is like that this *Proteus* of *Matter*, being held by the Sleeves, will turne and change into many *Metamorphoſes*. Take therefore a *Square Veſſell* of *Iron*, in forme of a Cube, and let it have good thicke and ſtrong Sides. Put into it a Cube of *Wood*, that may fill it as cloſe as may be; And let it have a Cover of Iron, as ſtrong (at leaſt) as the Sides; And let it be well Luted, after the manner of the *Chymiſts*. Then place the *Veſſell* within burning *Coales*, kept quicke kindled, for ſome few houres ſpace. Then take the *Veſſell* from the *Fire*, and take off the Cover, and ſee what is become of the *Wood*. I conceive that ſince all *Inflammation*, and *Evaporation* are utterly prohibited, and the *Body* ſtill turned upon it Selfe, that one of theſe two Effects will follow: Either that the *Body* of the *Wood* will be turned into a kinde of *Amalagma*, (as the *Chymiſts* call it;) Or that the Finer Part will be turned into *Aire*, and the Groſſer ſticke as it were baked, and incruſtate upon the Sides of the *Veſſell*; being become of a Denſer Matter, than the *Wood* it ſelfe, Crude. And for another Triall, take alſo *Water*, and put it in the like Veſſell, ſtopped as before; But uſe a gentler *Heat*, and remove the Veſſell ſometimes from the Fire; And againe, after ſome ſmall time, when it is Cold, renew the *Heating* of it: And repeat this *Alteration* ſome few times: And if you can once bring to paſſe, that the *Water*, which is one of the Simpleſt of Bodies, be changed in Colour, Odour, or Taſte, after the manner of Compound Bodies, you may be ſure that there is a great Worke wrought in Nature, and a Notable Entrance made into ſtrange Changes of Bodies, and productions: And alſo a Way made, to doe that by Fire, in ſmall time, which the Sunne and Age doe in long time. But of the Admirable Effects of this *Diſtillation in Cloſe*, (for ſo we call it) which is like the *Wombes* and *Matrices* of living creatures, where nothing Expireth, nor Separateth; We will ſpeake fully, in the due place; Not that we Aime at the making of *Paracelſus Pigmey's*; Or any ſuch Prodigious Follies; But that we know the Effects of *Heat* will be ſuch, as will ſcarce fall under the Conceit of Man; If the force of it bee altogether kept in.

Experiment Solitary touching the *Impossibility* of *Annihilation.*

100

THere is nothing more Certain in Nature, than that it is impossible for any *Body*, to be utterly *Annihilated*; But that, as it was the worke of the Omnipotency of *God*, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well said, by an Obscure Writer of the *Sect* of the *Chymists*; That there is no such way to effect the Strange *Transmutations* of *Bodies*, as to endevour and urge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained also a great Secret of Preservation of Bodies from Change; For if you can prohibit, that they neither turne into *Aire*, because no *Aire* commeth to them; Nor goe into the *Bodies Adjacent*, because they are utterly Heterogeneall; Nor make a *Round* and *Circulation* within themselves; they will never change, though they be in their Nature never so Perishable, or Mutable. Wee see, how *Flies*, and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument*, and *Embalming* of the *Body* of any *King*. And I conceive the like will bee of *Bodies* put into *Quick-silver*. But then they must be but thinne; As a leafe, or a peece of Paper, or Parchment; For if they have a greater Crassitude, they will alter in their own Body, though they spend not. But of this, Wee shall speake more, when we handle the *Title* of *Conservation* of *Bodies*.

NA-

NATVRALL HISTORIE.

II. Century.

MUSICKE in the *Practice*, hath beene well pursued; And in good Varietie: But in the *Theory*, and especially in the *Yeelding* of the *Causes* of the *Practique*, very weakly; being reduced into certaine Mysticall Subtilties, of no use, and not much Truth. We shall therefore, after our manner, joyne the *Contemplative* and *Active Part* together.

Experiments in Coasort touching *Musicke*.

101 All *Sounds*, are either *Musicall Sounds*, which we call *Tones*; Whereunto there may be an *Harmony*; which *Sounds* are ever *Equall*; As *Singing*, the *Sounds of Stringed*, and *Wind-Instruments*, the *Ringing of Bels*, &c. Or *Immusicall Sounds*; which are ever *Vnequall*; Such as are the *Voyce in Speaking*, all *Whisperings*, all *Voyces of Beasts, and Birds*, (except they bee *Singing Birds*;) all *Percussions*, of *Stones*, *Wood*, *Parchment*, *Skins*, (as in *Drummes*;) and infinite others.

102 The *Sounds* that produce *Tones*, are ever from such *Bodies*, as are in their Parts and Pores *Equall*; As well as the *Sounds* themselves are *Equall*; And such are the *Percussions* of *Metall*, as in *Bels*; Of *Glasse*, as in the Fillipping of a *Drinking Glasse*; Of *Aire*, as in *Mens voices whilest they Sing*, in *Pipes*, *Whistles*, *Organs*, *Stringed Instruments*, &c. And of *Water*, as in the *Nightingale Pipes* of *Regalls*, or *Organs*, and other *Hydraulicks*; which the *Ancients* had, and *Nero* did so much esteeme, but are now lost. And if any Man think, that the *String* of the *Bow*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an error. For the *Sound* is not created betweene the *Bow* or *Plectrum*, and the *String*; But between the *String* and the *Aire*; No more than it is between the *Finger* or *Quill*, and the *String*, in other *Instruments*. So there are (in effect) but three *Percussions* that

create *Tones*; *Percuſſions* of *Metals*, (comprehending *Glaſſe*, and the like;) *Percuſſions* of *Aire*; and *Percuſſions* of *Water*.

103 The *Diapaſon* or *Eight* in *Muſick* is the ſweeteſt *Concord*; In ſo much, as it is in effect an *Vniſon*; As we ſee in *Lutes*, that are ſtrung in the Baſe *Strings* with two ſtrings, one an *Eight* above another; which make but as one *Sound*. And every *Eight Note* in Aſcent, (as from *Eight* to *Fifteene*, from *Fifteene* to *twenty two*, and ſo *in infinitum*,) are but *Scales of Diapaſon*. The *Cauſe* is darke, and hath not been rendred by any; And therefore would be better contemplated. It ſeemeth that Aire, (which is the Subject of *Sounds*) in *Sounds* that are not *Tones*, (which are all *unequall*, as hath been ſaid) admitteth much Varietie; As wee ſee in the *Voyces* of *Living Creatures*; And likewiſe in the *Voyces* of ſeverall *Men*; (for we are capable to diſcerne ſeverall *Men* by their *Voyces*;) And in the *Conjugation of Letters*, whence *Articulate Sounds* proceed; Which of all others are moſt various. But in the Sounds which wee call *Tones*, (that are ever *Equall*) the *Aire* is not able to caſt it ſelfe into any ſuch varietie; But is forced to recurre into one and the ſame Poſture or Figure, onely differing in Greatneſſe and Smalneſſe. So we ſee *Figures* may be made of lines, Crooked and Straight, in infinite Varietie, where there is Inequality; But *Circles*, or *Squares*, or *Triangles Equilaterall*, (which are all *Figures*, of Equall lines) can differ but in Greater, or Leſſer.

104 It is to be noted (the rather leſt any Man ſhould thinke, that there is any thing in this *Number* of *Eight*, to create the *Diapaſon*,) that this Computation of *Eight*, is a thing rather received, than any true Computation. For a true Computation ought ever to bee, by Diſtribution into equall Portions. Now there be intervenient in the *Riſe* of *Eight* (in *Tones*) two *Beemolls*, or *Halfe-notes*; So as if you divide the *Tones* equally, the *Eight* is but *Seven* whole and equall *Notes*; And if you ſubdivide that into *Halfe Notes*, (as it is in the Stops of a *Lute*,) it maketh the *Number* of *thirteene*.

105 Yet this is true; That in the ordinary Riſes and Fals of the *Voyce* of *Man*, (not meaſuring the *Tone* by whole Notes, and halfe Notes, which is the Equall Meaſure;) there fall out to bee two Beemols (as hath beene ſaid) betweene the *Vniſon* and the *Diapaſon*: And this Varying is naturall. For if a Man would endevour to raiſe or fall his *Voyce*, ſtill by *Halfe-Notes*, like the Stops of a *Lute*; or by whole *Notes* alone, without *Halfes*; as farre as an *Eight*; hee will not be able to frame his *Voyce* unto it. Which ſheweth, that after every three whole *Notes* Nature requireth, for all Harmonicall uſe, one *halfe Note* to be interpoſed.

106 It is to bee conſidered, that whatſoever Vertue is in *Numbers*, for Conducing to Concent of *Notes*, is rather to bee aſcribed to the *Ante-number*, than to the *Entire Number*; As namely, that the Sound returneth after *Six*, or after *Twelve*; So that the *Seventh*, or the *Thirteenth* is not the Matter, but the *Sixth*, or the *Twelfth*; And the *Seventh* and the *Thirteenth* are but the limits and Boundaries of the *returne*.

107 The *Concords* in *Muſicke* which are *Perfect*, or *Semiperfect*, betweene the *Vniſon*, and the *Diapaſon*, are the *Fifth*, which is the moſt *Perfect*; the *Third* next; And the *Sixth* which is more harſh: And as the Ancients eſteemed, and ſo doe my ſelfe and ſome Other yet, the *Fourth* which they call *Diateſſeron*. As for the *Tenth*, *Twelfth*, *Thirteenth*, and ſo *in Infinitum*; they be but *Recurrences* of the Former; viz. of the *Third*, the *Fifth*, and the *Sixth*; being an *Eight* reſpectively from them.

108 For *Diſcords*, the *Second*, and the *Seventh*, are of all others the moſt odious, in *Harmony*, to the *Senſe*; whereof the One is next above the *Vniſon*, the

Other

Other next under the *Diapaſon*: which may ſhew, that *Harmony* requireth a competent diſtance of *Notes*.

In *Harmony*, if there be not a *Diſcord* to the *Baſe*, it doth not diſturbe the *Harmony*, though there be a *Diſcord* to the *Higher Parts*; So the *Diſcord* be not of the Two that are Odious; And therefore the ordinary *Concent* of *Foure Parts* conſiſteth of an *Eight*, a *Fifth*, and a *Third* to the *Baſe*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the *Cauſe* is, for that the *Baſe* ſtriking more Aire, doth overcome and drowne the *Treble*, (unleſſe the *Diſcord* be very Odious;) And ſo hideth a ſmall Imperfection. For wee ſee, that in one of the *lower Strings* of a *Lute*, there ſoundeth not the Sound of the *Treble*, nor any *Mixt Sound*, but onely the *Sound* of the *Baſe*. 109

Wee have no *Muſick* of *Quarter-Notes*; And it may be, they are not capable of *Harmony*; For we ſee the *Halfe-Notes* themſelves doe but interpoſe ſometimes. Nevertheleſſe we have ſome *Slides* or *Reliſhes*, of the Voyce, or Strings, as it were continued without *Notes*, from one *Tone* to another, riſing or falling, which are delightfull. 110

The Cauſes of that which is *Pleaſing*, or *Ingrate* to the *Hearing*, may receive light by that, which is *Pleaſing* or *Ingrate* to the *Sight*. There bee two Things Pleaſing to the Sight (leaving *Pictures*, and *Shapes* aſide, which are but Secondary Objects; And pleaſe or diſpleaſe but in Memory;) theſe two are, *Colours*, and *Order*. The pleaſing of *Colour* ſymbolizeth with the *Pleaſing* of any *Single Tone* to the *Eare*; But the Pleaſing of *Order* doth ſymbolize with *Harmony*. And therefore we ſee in *Garden-knots*, and the *Frets of Houſes*, and all equall and well-anſwering *Figures*, (as *Globes*, *Pyramides*, *Cones*, *Cylenders*, &c.) how they pleaſe; whereas *unequall Figures* are but Deformities. And both theſe *Pleaſures*, that of the *Eye*, and that of the *Eare*, are but the Effects of *Equalitie*, *Good Proportion*, or *Correſpondence*: So that (out of *Queſtion*) *Equalitie*, and *Correſpondence*, are the *Cauſes* of *Harmony*. But to finde the *Proportion* of that *Correſpondence*, is more abſtruſe; whereof notwithſtanding we ſhall ſpeake ſomewhat, (when we handle *Tones*,) in the generall Enquiry of *Sounds*. 111

Tones are not ſo apt altogether to procure *Sleep*, as ſome other *Sounds*; As the *Wind*, the *Purling of Water*, *Humming of Bees*, a *Sweet Voyce* of one that readeth, &c. The *Cauſe* whereof is, for that *Tones*, becauſe they are Equall, and ſlide not, doe more ſtrike and erect the Senſe, than the other. And Overmuch Attention hindreth *Sleep*. 112

There bee in *Muſick* certaine *Figures*, or *Tropes*; almoſt agreeing with the *Figures* of *Rhetorick*; And with the *Affections* of the *Minde*, and other *Senſes*. Firſt, the *Diviſion* and *Quavering*, which pleaſe ſo much in *Muſick*, have an Agreement with the *Gluttering* of *Light*; As the *Moon-Beames* playing upon a Wave. Againe, the *Falling* from a *Diſcord* to a *Concord*, which maketh great Sweetneſſe in *Muſick*, hath an Agreement with the *Affections*, which are reintegrated to the better, after ſome diſlikes: It agreeth alſo with the *Taſte*, which is ſoone glutted with that which is ſweet alone. The *Sliding from the Cloſe or Cadence*, hath an Agreement with the *Figure* in *Rhetoricke*, which they call *Præter Expectatum*; For there is a Pleaſure even in *being deceived*. The *Reports*, and *Fuges*, have an Agreement with the *Figures* in *Rhetorick*, of *Repetition*, and *Traduction*. The *Tripla's*, and *Changing of times*, have an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Meaſure Time*, are in the *Medley* of one *Dance*. 113

It hath beene anciently held, and obſerved, that the *Senſe of Hearing*, and the *Kindes of Muſick*, have moſt Operation upon *Manners*; As to Incourage Men, 114

Men, and make them warlike; To make them Soft and Effeminate; To make them Grave; To make them Light; To make them Gentle and inclin'd to Pitty, &c. The *Cause* is, for that the *Sense of Hearing* striketh the *Spirits* more immediately, than the other *Senses*; And more incorporeally than the *Smelling*: For the *Sight*, *Taste*, and *Feeling*, have their Organs, not of so present and immediate Accesse to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh also immediatly upon the *Spirits*, and is forcible while the Object remaineth,) it is with a communication of the Breath, or Vapour of the *Object Odorate*: But *Harmony* entring easily, and Mingling not at all, and Comming with a manifest Motion; doth by Custome of often Affecting the *Spirits*, and Putting them into one kinde of Posture, alter not a little the Nature of the *Spirits*, even when the Object is removed. And therefore we see, that *Tunes* and *Aires*, even in their owne Nature, have in themselves some Affinitie with the *Affections*; As there bee *Merry Tunes*, *Dolefull Tunes*, *Solemne Tunes*; *Tunes inclining Mens mindes to Pitty*; *Warlike Tunes*; &c. So as it is no Marvell, if they alter the *Spirits*; considering that *Tunes* have a Prediſposition to the *Motion* of the *Spirits* in themselves. But yet it hath beene noted, that though this variety of *Tunes*, doth dispose the *Spirits* to variety of Passions, conforme unto them; yet generally, *Musick* feedeth that disposition of the *Spirits* which it findeth. Wee see also that severall *Aires*, and *Tunes*, doe please severall *Nations*, and *Persons*, according to the Sympathy they have with their *Spirits*.

Experiments in Consort touching *Sounds*; and first touching the *Nullity*, *and Entity of Sounds*.

Perspective hath beene with some diligence inquired; And so hath the *Nature of Sounds*, in some sort, as farre as concerneth *Musick*. But the *Nature of Sounds* in generall, hath beene superficially observed. It is one of the subtilleſt Peeces of Nature. And besides, I practise, as I doe advise; which is, after long Inquiry of Things, Immerse in Matter, to interpose some Subject, which is Immateriate, or lesse Materiate; Such as this of *Sounds*; To the end, that the *Intellect* may be Rectified, and become not Partiall.

115 It is first to be considered, what *Great Motions* there are in Nature, which passe without *Sound*, or *Noise*. The *Heavens* turne about, in a most rapide Motion, without *Noise* to us perceived; Though in some *Dreames* they have beene said to make an excellent *Musick*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stella Cadens*, &c.) yeeld no *Noise*. And if it be thought, that it is the Greatnesse of distance from us, whereby the *Sound* cannot be heard; We see that *Lightnings*, and *Coruscations*, which are neare at hand, yeeld no *Sound* neither. And yet in all these, there is a Percussion and Division of the *Aire*. The *Windes* in the *Vpper Region* (which move the *Clouds* above (which we call the *Racke*) and are not perceived below) passe without *Noise*. The *lower Windes* in a Plaine, except they be strong, make no *Noise*; But amongst Trees, the *Noise*, of such *Windes* will be perceived. And the *Windes* (generally) when they make a *Noise*, doe ever make it unequally, Rising and Falling, and sometimes (when they are vehement,) Trembling at the Height of their Blast. *Raine*, or *Haile* falling, (though vehemently,) yeeldeth no *Noise*, in passing through the *Aire*, till it fall upon the Ground, Water, Houses, or the like. *Water* in a *River* (though a swift Streame) is not heard in the Channell,

but

but runneth in Silence, if it be of any depth; But the very *Streame* upon *Shallowes*, of Gravell, or Pebble, will be heard. And *Waters*, when they beat upon the Shore, or are straitned, (as in the falls of Bridges;) Or are dashed against themselves, by *Windes*, give a Roaring *Noise*. Any *peece of Timber*, or *Hard Body*, being thrust forwards by another Body Contiguous, without knocking, giveth no *Noise*. And so *Bodies* in weighing, one upon another, though the *upper Body* presse the *lower Body* downe, make no *Noise*. So the *Motion* in the *Minute Parts* of any *Solide Body*, (which is the Principall Cause of *Violent Motion*, though unobserved;) passeth without *Sound*; For that *Sound*, that is heard sometimes, is produced onely by the Breaking of the *Aire*; And not by the Impulsion of the Parts. So it is manifest; That where the Anteriour Body giveth way, as fast as the Posteriour commeth on, it maketh no *Noise*; be the *Motion* never so great, or swift.

Aire open, and at *large*, maketh no *Noise*, except it bee sharply percussed; 116
As in the *Sound* of a String, where *Aire* is percussed by a hard, and stiffe Body; And with a sharp loose; For if the String be not strained, it maketh no *Noise*. But where the *Aire is pent*, and straitned, there Breath, or other Blowing, (which carry but a gentle Percussion,) suffice to create *Sound*; As in *Pipes*, and *Winde-Instruments*. But then you must note, that in *Recorders*, which goe with a gentle Breath, the *Concave* of the *Pipe*, were it not for the *Fipple*, that straitneth the Aire, (much more than the *Simple Concave*;) would yeeld no *Sound*. For as for other *Winde-Instruments*, they require a forcible Breath; As *Trumpets*, *Cornets*, *Hunters-Hornes*, &c. Which appeareth by the blowne Cheeks of him that windeth them. *Organs* also are blowne with a strong winde, by the Bellowes. And note againe, that some kinde of *Wind-Instruments*, are blowne at a small Hole in the side, which straitneth the Breath at the first Entrance; The rather, in respect of their *Traverse*, and *Stop* above the Hole, which performeth the *Fipples* Part; As it is seene in *Flutes*, and *Fifes*, which will not give *Sound*, by a Blast at the end, as *Recorders*, &c. doe. Likewise in all *whistling*, you contract the Mouth; And to make it more sharpe, Men sometimes use their Finger. But in *Open Aire*, if you throw a Stone, or a Dart, they give no *Sound*: No more doe *Bullets*, except they happen to be a little hollowed in the Casting; Which Hollownesse penneth the *Aire*: Nor yet *Arrowes*, except they bee ruffled in their Feathers, which likewise penneth the *Aire*. As for *Small whistles*, or *Shepheards Oaten Pipes*; they give a *Sound*, because of their extreme Slendernesse, whereby the *Aire* is more pent, than in a Wider *Pipe*. Againe, the *Voyces* of *Men*, and Living Creatures, passe through the throat, which penneth the Breath. As for the *Iewes Harpe*, it is a sharp Percussion; And besides, hath the vantage of penning the *Aire* in the Mouth.

Solide Bodies, if they be *very softly percussed*, give no *Sound*; As when a Man treadeth very softly upon *Boards*. So *Chests* or *Doores* in faire weather, when they open easily, give no *Sound*. And *Cart-Wheeles* squeak not when they are liquoured. 117

The *Flame of Tapers*, or *Candles*, though it be a swift Motion, and breaketh the *Aire*, yet passeth without *Sound*. *Aire in Ovens*, though (no doubt) it doth (as it were) boyle, and dilate it self, and is repercussed; yet it is without *Noise*. 118

Flame percussed by Aire, giveth a *Noise*; As in blowing of the Fire by Bellowes; Greater, than if the Bellowes should blow upon the *Aire* it selfe. And so likewise *Flame Percussing the Aire strongly*, (as when Flame suddenly taketh and openeth,) giveth a *Noise*; So, Great *Flames*, whiles the one impelleth the other, give a bellowing *Sound*. 119

There

120 There is a Conceit tunneth abroad, that there ſhould be a *white Powder*, which will diſcharge a Peece without *Noiſe*; which is a dangerous Experiment, if it ſhould be true: For it may cauſe ſecret Murthers. But it ſeemeth to me unpoſſible; For, if the *Aire pent*, be driven forth, and ſtrike the *Aire open*, it will certainly make a *Noiſe*. As for the *white Powder*, (if any ſuch thing bee, that may extinguiſh, or dead the *Noiſe*,) it is like to bee a Mixture of *Petre*, and *Sulphur*, without *Coale*. For *Petre* alone will not take Fire. And if any Man thinke, that the *Sound* may bee extinguiſhed, or deaded, by diſcharging the *Pent Aire*, before it commeth to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more divided *Sounds*: As if you ſhould make a Croſſe Barrell hollow, thorow the Barrell of a Peece, it may be, it would give ſeverall Sounds, both at the Noſe, and at the Sides. But I conceive, that if it were poſſible, to bring to paſſe, that there ſhould be no *Aire* pent at the Mouth of the Peece, the Bullet might flie with ſmall, or no *Noiſe*. For firſt it is certaine, there is no *Noiſe* in the Percuſſion of the *Flame* upon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noiſe*; As hath beene ſaid. And then, if there be no *Pent Aire*, that ſtriketh upon *Open Aire*, there is no Cauſe of *Noiſe*; And yet the Flying of the *Bullet* will not be ſtayed. For that *Motion* (as hath been oft ſaid) is in the Parts of the *Bullet*, and not in the *Aire*. So as triall muſt bee made by taking ſome ſmall *Concave* of *Metall*, no more than you meane to fill with Powder; And laying the Bullet in the Mouth of it, halfe out into the *Open Aire*.

121 I heard it affirmed by a Man, that was a great Dealer in Secrets, but hee was but vaine; That there was a *Conſpiracy* (which himſelfe hindred,) to have killed *Queene Mary*, Siſter to *Queen Elizabeth*, by a *Burning Glaſſe*, when ſhee walked in *Saint Iames* Parke, from the Leads of the Houſe. But thus much (no doubt) is true; That if *Burning Glaſſes* could bee brought to a great ſtrength, (as they talke generally of *Burning-Glaſſes*, that are able to burne a *Navy*,) the *Percuſſion* of the *Aire* alone, by ſuch a *Burning-Glaſſe* would make no *Noiſe*; No more than is found in *Corruſcations*, and *Lightnings*, without *Thunders*.

122 I ſuppoſe, that *Impreſſion* of the *Aire* with *Sounds*, asketh a time to bee conveighed to the *Senſe*; As well as the *Impreſſion* of *Species viſible*. Or elſe they will not be heard. And therefore, as the Bullet *moveth* ſo *ſwift*, that it is *Inviſible*; So the ſame *Swifneſſe* of *Motion* maketh it *Inaudible*: For wee ſee, that the Apprehenſion of the *Eye*, is quicker than that of the *Eare*.

123 All *Eruptions* of *Aire*, though ſmall and ſlight, give an *Entitie of Sound*; which we call *Crackling*, *Puffing*, *Spitting*, &c. As in *Bay-ſalt*, and *Bay-leaves*, caſt into the Fire; So in *Cheſnuts*, when they leap forth of the Aſhes; So in *Greene Wood* laid upon the Fire, eſpecially *Roots*; So in *Candles* that ſpit Flame, if they be wet; So in *Raſping*, *Sneezing*, &c. So in a *Roſe-leafe* gathered together into the faſhion of a Purſe, and broken upon the Forehead, or Backe of the Hand, as Children uſe.

Experiments in Conſort touching *Production*, *Conſervation*, and *Delatiõ of Sounds*; And the *Office* of the *Aire* therein.

124 THe *Cauſe* given of *Sound*, that it ſhould be an *Eliſion* of the *Aire* (whereby, if they meane any thing, they meane a *Cutting*, or *Dividing*, or elſe an *Attenuating* of the *Aire*) is but a Terme of Ignorance: And the Motion is but a Catch of the Wit upon a few Inſtances; As the Manner is in the *Philoſophy* Received. And it is common with Men, that if they have gotten a Pretty *Expreſſion*, by a *Word* of *Art*, that *Expreſſion* goeth currant; though it be empty of *Matter*. This Conceit of *Eliſion*, appeareth moſt manifeſtly

to

to be falſe, in that the *Sound* of a *Bell*, *String*, or the like, continueth melting, ſometime, after the *Percuſſion*; But ceaſeth ſtraight-wayes, if the *Bell*, or *String*, be touched and ſtayed: whereas, if it were the *Eliſion* of the *Aire*, that made the *Sound*, it could not bee, that the Touch of the *Bell*, or *String*, ſhould extinguiſh ſo ſuddenly that Motion, cauſed by the *Eliſion* of the *Aire*. This appeareth yet more manifeſtly, by *Chiming* with a Hammer, upon the Out-ſide of a *Bell*; For the *Sound* will be according to the inward Concave of the *Bell*; whereas the *Eliſion*, or *Attenuation* of the *Aire*, cannot be but onely betweene the *Hammer*, and the Out-ſide of the *Bell*. So againe, if it were an *Eliſion*, a broad *Hammer*, and a *Bodkin*, ſtruck upon Metall, would give a divers *Tone*; As well as a divers *Loudneſſe*: But they doe not ſo; For though the *Sound* of the one be *Louder*, and of the other *Softer*, yet the *Tone* is the ſame. Beſides, in *Eccho's* (whereof ſome are as loud as the *Originall Voice*,) there is no new *Eliſion*, but a *Repercuſſion* onely. But that which convinceth it moſt of all, is; that *Sounds* are generated, where there is no *Aire* at all. But theſe and the like Conceits, when Men have cleared their underſtanding, by the light of Experience, will ſcatter, and breake up like a Miſt.

It is certaine, that *Sound* is not produced at the firſt, but with ſome *Locall Motion* of the *Aire*, or *Flame*, or ſome other *Medium*; Nor yet without ſome *Reſiſtance*, either in the *Aire*, or the *Body Percuſſed*. For if there be a meere Yeelding, or Ceſſion, it produceth no *Sound*; As hath beene ſaid. And therein *Sounds* differ from *Light*, and *Colours*; which paſſe thorow the *Aire*, or other *Bodies*, without any *Locall Motion* of the *Aire*; either at the firſt, or after. But you muſt attentively diſtinguiſh, between the *Locall Motion* of the *Aire*, (which is but *Vehiculum Cauſæ*, *A Carrier of the Sounds*,) and the *Sounds* themſelves, Conveighed in the *Aire*. For as to the former, we ſee manifeſtly, that no *Sound* is produced (no not by *Aire* it ſelfe againſt other *Aire*, as in *Organs*, &c.) but with a perceptible *Blaſt* of the *Aire*; And with ſome *Reſiſtance* of the *Aire* ſtrucken. For even all *Speech*, (which is one of the gentleſt *Motions* of *Aire*,) is with *Expulſion* of a little *Breath*. And all *Pipes* have a Blaſt, as well as a *Sound*. We ſee alſo manifeſtly, that *Sounds* are carried with *Wind*: And therefore *Sounds* will be heard further with the *Wind*, than againſt the *Wind*; And likewiſe doe riſe and fall with the Intenſion or Remiſſion of the *Wind*. But for the *Impreſſion* of the *Sound*, it is quite another Thing; And is utterly without any *Locall Motion* of the *Aire*, Perceptible; And in that reſembleth the *Species Viſible*: For after a *Man* hath lured, or a *Bell* is rung, we cannot diſcerne any *Perceptible Motion* (at all) in the *Aire*, along as the *Sound* goeth; but onely at the firſt. Neither doth the *Wind* (as farre as it carryeth a *Voice*,) with the *Motion* thereof, confound any of the Delicate, and Articulate Figurations of the *Aire*, in Varietie of Words. And if a *Man* ſpeake a good loudneſſe, againſt the *Flame* of a *Candle*, it will not make it tremble much; though moſt, when thoſe *Letters* are pronounced, which contract the Mouth; As *F*, *S*, *V*, and ſome others. But *Gentle Breathing*, or *Blowing* without *ſpeaking*, will move the *Candle* farre more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, becauſe as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Aire* at firſt; So it paralleleth in ſo many other things with the *Sight*, and *Radiation* of *Things viſible*; Which (without all queſtion) induce no *Locall Motion* in the *Aire*, as hath beene ſaid. 125

Neverthleſſe it is true, that upon the *Noiſe* of *Thunder*, and great *Ordnance*; Glaſſe windowes will ſhake; and Fiſhes are thought to bee frayed with 126

with the Motion, cauſed by *Noiſe* upon the water. But theſe Effects are from the Locall Motion of the *Aire*, which is a Concomitant of the *Sound*, (as hath beene ſaid;) and not from the *Sound*.

127 It hath beene anciently reported, and is ſtill received, that *Extreme Applauſes*, and *Shouting of People* aſſembled in great Multitudes, have ſo rarified, and broken the Aire, that *Birds* flying over, have fallen downe, the Aire being not able to ſupport them. And it is beleeved by ſome, that *Great Ringing of Bells* in populous Cities, hath chaſed away *Thunder*: and alſo diſſipated Peſtilent Aire: All which may bee alſo from the Concuſſion of the Aire, and not from the *Sound*.

128 A very great *Sound*, neare hand, hath ſtrucken many *Deafe*; And at the Inſtant they have found, as it were, the breaking of a Skin or Parchment in their Eare: And my Selfe ſtanding neare one that *Lured* loud, and ſhrill, had ſuddenly an Offence, as if ſomewhat had broken, or beene diſlocated in my *Eare*; And immediately after, a *loud Ringing*; (Not an ordinary Singing, or Hiſſing, but farre louder, and differing;) ſo as I feared ſome *Deafeneſſe*. But after ſome halfe Quarter of an Houre it vaniſhed. This Effect may be truly referred unto the *Sound*: For (as is commonly received) an *over-potent Object* doth deſtroy the *Senſe*; And *Spirituall Species*; (both *Viſible* and *Audible*,) will worke upon the Senſories, though they move not any other Body.

129 In *Delation of Sounds*, the *Encloſure* of them preſerveth them, and cauſeth them to be heard further. And we find in Rowles of Parchment, or Truncks, the Mouth being laid to the one end of the Rowle of Parchment, or Trunk, and the *Eare* to the other, the *Sound* is heard much further, than in the *Open Aire*. The *Cauſe* is, for that the *Sound* ſpendeth, and is diſſipated in the *Open Aire*; But in ſuch Concaves it is conſerved, and contracted. So alſo in a Peece of Ordnance, if you ſpeake in the Touch-hole, and another lay his *Eare* to the Mouth of the Peece, the *Sound* paſſeth, and is farre better heard, than in the *Open Aire*.

130 It is further to be conſidered, how it proveth and worketh, when the *Sound* is not encloſed all the Length of his Way, but paſſeth partly through open Aire; As where you *ſpeake* ſome diſtance from a *Truncke*; or where the *Eare* is ſome diſtance from the *Truncke*, at the other End; Or where both *Mouth* and *Eare* are diſtant from the *Truncke*. And it is tried, that in a long *Truncke*, of ſome eight or tenne foot, the *Sound* is holpen, though both the *Mouth*, and the *Eare* be a handfull, or more, from the Ends of the *Truncke*; And ſomewhat more holpen, when the *Eare* of the *Hearer* is neare, than when the *Mouth* of the *Speaker*. And it is certaine, that the *Voice* is better heard in a *Chamber* from *abroad*, than *abroad* from within the *Chamber*.

131 As the *Encloſure*, that is *Round about and Entire*, preſerveth the *Sound*; So doth a *Semi-Concave*, though in a leſſe degree. And therefore, if you divide a *Truncke*, or a *Cane* into two, and one ſpeake at the one end, and you lay your Eare at the other, it will carry the *Voyce* further, than in the *Aire* at large. Nay further, if it be not a full *Semi-Concave*; but if you doe the like upon the *Maſt* of a *Ship*, or a *long Pole*, or a *Peece of Ordnance* (though one ſpeake upon the Surface of the *Ordnance*, and not at any of the Bores;) the *Voice* will be heard further, than in the Aire at large.

132 It would bee tried, how, and with what proportion of diſadvantage, the *Voyce* will be carried in an *Horne*, which is a line Arched; Or in a *Trumpet*, which is a line Retorted; Or in ſome *Pipe* that were Sinuous.

It

It is certaine, (howsoever it crosse the Received Opinion) that *Sounds* may be created without *Aire*, though *Aire* be the most favourable *Deferent* of *Sounds*. Take a *Vessell* of *Water*, and knap a paire of Tongs some depth within the Water, and you shall heare the *Sound* of the Tongs well, and not much diminished; And yet there is no *Aire* at all present. 133

Take one *Vessell* of *Silver*, and another of *Wood*, and fill each of them full of Water, and then knap the Tongs together, as before, about an handfull from the Bottome, and you shall finde the *Sound* much more Resounding from the *Vessell* of *Silver*, than from that of *Wood*: And yet if there be no water in the *Vessell*, so that you knap the Tongs in the *Aire*, you shall finde no difference, betweene the *Silver* and the *Wodden Vessell*. Whereby, beside the maine point of creating *Sound* without *Aire*, you may collect two Things: The one, that the *Sound* communicateth with the Bottome of the *Vessell*: The other, that such a Communication passeth farre better, thorow *Water* than *Aire*. 134

Strike any *Hard Bodies* together, in the midst of a *Flame*, and you shall heare the *Sound* with little difference, from the *Sound* in the *Aire*. 135

The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath some Affinity with the *Aire*; performeth, in some degree, the Parts of the *Aire*; As when you knock upon an *Empty Barrell*, the *Sound* is (in part) created by the *Aire* on the Out-side; And (in part) by the *Aire* in the Inside; For the *Sound* will be greater or lesser, as the Barrell is more Empty, or more Full; But yet the *Sound* participateth also with the *Spirit* in the *Wood*, thorow which it passeth, from the Out-side to the Inside: And so it commeth to passe in the *Chiming* of *Bels*, on the Outside; where also the *Sound* passeth to the Inside: And a number of other like Instances, whereof we shall speak more when we handle the *Communication* of *Sounds*. 136

It were extreame Grosseneſse to think, (as we have partly touched before, that the *Sound* in *Strings* is made, or produced, betweene the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Vehicula motus*, *Passages* to the *Creation* of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulsion* of the *Aire* from the first *motion* of the *String*; but by the *Returne* or *Result* of the *String*, which was strained by the Touch, to his former Place: which *Motion* of *Result* is quick and sharpe; Whereas the first Motion is soft and dull. So the *Bow* tortureth the *String* continually, and thereby holdeth it in a Continuall *Trepidation*. 137

TAke a *Trunck*, and let one whistle at the one End, and hold your Eare at the other, and you shall finde the *Sound* strike so sharpe, as you can scarce endure it. The *Cause* is, for that *Sound* diffuseth it selfe in round, And so spendeth it Selfe; But if the *Sound*, which would scatter in *Open Aire*, be made to go all into a Canale; It must needs give greater force to the *Sound*. And so you may note, that *Enclosures* doe not only preserve *Sound*, but also encrease and sharpen it. 138 Experiments in Consort touching the *Magnitude*, and *Exility*, and *Damps* of *Sounds*.

A *Hunters Horne*, being greater at one end, than at the other, doth encrease the *Sound* more, than if the *Horne* were all of an equall Bore. The *Cause* is, for that the *Aire*, and *Sound*, being first contracted at the lesser End, and afterwards having more Roome to spread at the greater End, do dilate themselves; And in comming out strike more *Aire*; whereby the *Sound* is the Greater, and Baser. And even *Hunters Hornes*, which are sometimes made straight, and not Oblique, are ever greater at the lower end. It would 139

be tried also in *Pipes*, being made *far larger* at the lower End: Or being made with a *Belly* towards the lower End; And then issuing into a straight Concave againe.

140 There is in *Saint Iames's Fields*, a *Conduit* of *Brick*, unto which joyneth a *low Vault*; And at the End of that, a *Round House* of Stone: And in the *Brick Conduit* there is a Window; And in the *Round House* a Slit or Rift of some little breadth: If you cry out in the Rift, it will make a fearfull roaring at the Window. The *Cause* is the same with the former; For that all *Concaves*, that proceed from more Narrow to more Broad, do amplifie the *Sound* at the Comming out.

141 *Hawkes Bels*, that have Holes in the Sides, give a greater Ring, than if the Pellet did strike upon Brasse, in the *Open Aire*. The Cause is the same with the first *Instance* of the *Trunck*; Namely, for that the *Sound* Enclosed with the Sides of the *Bell*, commeth forth at the *Holes* unspent, and more strong.

142 In *Drums*, the Closenesse round about, that preserveth the *Sound* from dispersing, maketh the *Noise* come forth at the *Drum-Hole*, farre more loud, and strong, than if you should strike upon the like *Skin*, extended in the Open Aire. The *Cause* is the same with the two precedent.

143 *Sounds* are better heard, and further off, in an *Evening*, or in the *Night*, than at the *Noone*, or in the *Day*. The *Cause* is, for that in the *Day*, when the *Aire* is more Thin, (no doubt) the *Sound* pierceth better; But when the *Aire* is more Thick (as in the *Night*) the *Sound* spendeth and spreadeth abroad lesse: And so it is a Degree of *Enclosure*. As for the *Night*, it is true also, that the Generall Silence helpeth.

144 There be two kinds of *Reflexions* of *Sounds*; The one at *Distance*, which is the *Eccho*; Wherein the *Originall* is heard distinctly, and the *Reflexion* also distinctly; Of which we shall speak hereafter: The other in *Concurrence*; When the *Sound* Reflecting (the *Reflexion* being neare at hand) returneth immediatly upon the *Originall*, and so iterateth it not, but amplifieth it. Therefore we see, that *Musick* upon the Water soundeth more; And so likewise *Musick* is better in Chambers Wainscotted, than Hanged.

145 The *Strings* of a Lute, or Violl, or Virginals, doe give a farre greater *Sound*, by reason of the *Knot*, and *Board*, and *Concave* underneath, than if there were nothing but only the *Flat* of a *Board*, without that *Hollow* and *Knot*, to let in the Upper Aire into the Lower. The *Cause* is, the Communication of the Upper Aire with the Lower; And Penning of both from Expence, or Dispersing.

146 An *Irish Harpe* hath Open Aire on both sides of the *Strings*: And it hath the *Concave* or *Belly*, not along the *Strings*, but at the End of the *Strings*. It maketh a more Resounding *Sound*, than a *Bandora*, *Orpharion*, or *Citterne*, which have likewise *Wire-strings*. I judge the *Cause* to be, for that Open Aire on both Sides helpeth, so that there be a *Concave*; Which is therefore best placed at the End.

147 In a *Virginall*, when the *Lid* is downe, it maketh a more exile *Sound*, than when the *Lid* is open. The *Cause* is, for that all *Shutting in* of *Aire*, where there is no competent Vent, dampeth the *Sound*: Which maintaineth likewise the former *Instance*; For the *Belly* of the *Lute*, or *Violl*, doth pen the *Aire* somewhat.

148 There is a *Church* at *Glocester*, (and as I have heard the like is in some other places;) where if you speak against a Wall, softly, another shall heare your *Voice* better a good way off, than neare hand. Enquire more particularly of the Frame of that Place. I suppose there is some Vault, or Hollow,

Hollow, or Isle, behinde the Wall, and some Passage to it towards the further end of that Wall, against which you speak; So as the *Voice* of him that speaketh, slideth along the Wall, and then entreth at some Passage, and communicateth with the *Aire* of the Hollow; For it is preserved somewhat by the plaine Wall; but that is too weak to give a *Sound* Audible, till it hath communicated with the back *Aire*.

Strike upon a *Bow-string*, and lay the *Horne* of the *Bow* neare your Eare, and it will encrease the *Sound*, and make a degree of a *Tone*. The *Cause* is, for that the Sensory, by reason of the Close Holding, is percussed, before the Aire disperseth. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great Entercourse betweene those two Parts; As appeareth by this; That a harsh *grating Tune* setteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put upon the Temples; But that is but the Slide of the *Sound* from thence to the Eare. 149

If you take a *Rod* of *Iron*, or *Brasse*, and hold the one end to your Eare, and strike upon the other, it maketh a far greater *Sound*, than the like Stroke upon the *Rod*, not so made Contiguous to the Eare. By which, and by some other *Instances*, that have beene partly touched, it should appeare; That *Sounds* do not only slide upon the Surface of a Smooth Body, but doe also communicate with the Spirits, that are in the Pores of the Body. 150

I remember in *Trinity Colledge* in *Cambridge*, there was an *Vpper Chamber*, which being thought weak in the Roofe of it, was supported by a Pillar of Iron, of the bignesse of ones Arme, in the middest of the *Chamber*; which if you had struck, it would make a little flat Noise in the *Room* where it was struck; But it would make a great Bombe in the *Chamber* beneath. 151

The *Sound* which is made by *Buckets* in a *Well*, when they touch upon the *Water*; Or when they strike upon the side of the *Well*; Or when two Buckets dash the one against the other; These *Sounds* are deeper, and fuller, than if the like Percussion were made in the *Open Aire*. The *Cause* is the Penning and Enclosure of the *Aire*, in the Concave of the *Well*. 152

Barrels placed in a Roome under the Floare of a *Chamber*, make all *Noises* in the same Chamber, more full and Resounding. 153

So that there be five wayes (*in generall*,) of Majoration of Sounds: Enclosure Simple; Enclosure with Dilatation; Communication; Reflexion Concurrent; *and* Approach *to the* Sensory.

For *Exility* of the *Voice*, or other *Sounds*: It is certaine, that the *Voice* doth passe thorow *Solid* and *Hard Bodies*, if they be not too thick. And thorow *Water*; which is likewise a very Close Body; and such an one, as letteth not in Aire. But then the *Voice*, or other *Sound*, is reduced, by such passage, to a great *Weakenesse*, or *Exility*. If therefore you stop the *Holes* of a *Hawkes Bell*, it will make no Ring, but a flat Noise, or Rattle. And so doth the *Ætites*, or *Eagles* Stone, which hath a little Stone within it. 154

And as for *Water*, it is a certaine Triall: Let a Man go into a *Bath*, and take a *Paile*, and turne the Bottome upward, and carry the Mouth of it (Even,) downe to the Levell of the *Water*, and so presse it downe under the *Water*, some handfull and an halfe, still keeping it even, that it may not tilt on either side, and so the Aire get out: Then let him that is in the *Bath*, dive with his Head so far under *Water*, as he may put his Head into the *Paile*; and there will come as much *Aire* bubling forth, as will make Roome for his Head. Then let him speak, and any that shall stand without, shall heare his *Voice* plainly; but yet made extreame sharp and exile, like the *Voice* of 155

Puppets: But yet the *Articulate Sounds* of the *Words* will not be confounded. Note that it may be much more handsomely done, if the *Paile* be put over the Mans head above Water, and then he cowre downe, and the *Paile* be pressed downe with him. Note that a Man must kneele or sit, that he may be lower than the *Water*. A Man would think, that the *Sicilian Poet* had knowledge of this *Experiment*; For he saith; That *Hercules's Page Hylas* went with a Water-pot, to fill it at a pleasant *Fountaine*, that was neare the Shore, and that the *Nymphs* of the *Fountaine* fell in love with the Boy, and pulled him under *Water*, keeping him alive; And that *Hercules* missing his *Page*, called him by his Name aloud, that all the Shore rang of it; And that *Hylas* from within the Water, answered his Master; But (that which is to the present purpose) with so small and exile a *Voice*, as *Hercules* thought he had beene three Miles off, when the *Fountaine* (indeed) was fast by.

156 In *Lutes*, and *Instruments* of *Strings*, if you stop a *String* high, (whereby it hath lesse Scope to tremble) the *Sound* is more *Treble*, but yet more dead.

157 Take two *Sawcers*, and strike the Edge of the one against the Bottome of the other, within a *Paile* of *Water*; And you shall finde, that as you put the *Sawcers* lower, and lower, the *Sound* groweth more flat; even while Part of the *Sawcer* is above the Water; But that Flatnesse of *Sound* is joyned with a harshnesse of *Sound*; which (no doubt is caused by the inequality of the *Sound*, which commeth from the Part of the *Sawcer* under the *Water*, and from the Part above. But when the *Sawcer* is wholly under the *Water*, the *Sound* becommeth more cleare, but far more low; And as if the *Sound* came from afar off.

158 A *Soft Body* dampeth the *Sound*, much more than a *Hard*: As if a Bell hath Cloth, or Silk wrapped about it, it deadeth the *Sound* more, than if it were Wood. And therefore in *Clericalls*, the Keyes are lined; And in Colledges they use to line the Tablemen.

159 Triall was made in a *Recorder*, after these severall manners. The Bottome of it was set against the Palme of the Hand; stopped with Wax round about, set against a Damask Cushion; Thrust into Sand; into Ashes; into Water, (halfe an Inch under the Water;) Close to the Bottome of a Silver Basin; And still the *Tone* remained: But the Bottome of it was set against a Wollen Carpet; A Lining of Plush; A Lock of Wooll, (though loosely put in;) Against Snow; And the sound of it was quite deaded, and but Breath.

160 *Iron* Hot produceth not so full a *Sound*, as when it is Cold; For while it is hot, it appeareth to be more Soft, and lesse Resounding. So likewise *Warme Water*, when it falleth, maketh not so full a *Sound*, as *Cold*: And I conceive it is softer, and neerer the Nature of Oile; For it is more slippery; As may be perceived, in that it scowreth better.

161 Let there be a *Recorder* made, with two Fipples, at each end one; The *Trunck* of it of the length of two *Recorders*, and the Holes answerable towards each end; And let two play the same Lesson upon it, at an Unison; And let it be noted whether the *Sound* be confounded; or amplified; or dulled. So likewise let a *Crosse* be made, of two Truncks (thorowout) hollow; And let two speak, or sing, the one long wayes, the other traverse: And let two heare at the opposite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Instances* will also give light to the *Mixture* of *Sounds*; whereof we shall speak hereafter.

162 A *Bellowes* blowne in at the *Hole* of a *Drum*, and the *Drum* then strucken, maketh

maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindreth the Issue of the *Sound*; And partly for that it maketh the Aire, being blowne together, lesse moveable.

THe *Loudnesse*, and *Softnesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exilitie* of *Sounds*; For a *Base String*, though softly strucken, giveth the greater *Sound*; But a *Treble String*, if hard strucken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more Aire; And the *Treble* lesse Aire, but with a sharper Percussion.

Experiments in Consort touching the *Loudnesse*, or *Softnesse* of *Sounds*; and their *Carriage at longer or shorter Distance*.

It is therefore the *Strength* of the *Percussion*, that is a Principall *Cause* of the *Loudnesse* or *Softnesse* of *Sounds*: As in knocking harder or softer; Winding of a Horne stronger or weaker; Ringing of a Hand-bell harder or softer, &c. And the *Strength* of this *Percussion*, consisteth, as much, or more, in the *Hardnesse* of the *Body Percussed*, as in the *Force* of the *Body Percussing*: For if you strike against a Cloth, it will give a lesse *Sound*; If against Wood, a greater; If against Metall, yet a greater; And in Metals, if you strike against Gold, (which is the more pliant,) it giveth the flatter *Sound*; If against Silver, or Brasse, the more Ringing *Sound*. As for *Aire*, where it is strongly pent, it matcheth a *Hard Body*. And therefore wee see in discharging of a *Peece*, what a great Noise it maketh. Wee see also, that the Charge with Bullet; Or with Paper wet, and hard stopped; Or with Powder alone, rammed in hard; maketh no great difference in the *Loudnesse* of the Report. 163 164

The *Sharpnesse* or *Quickenesse* of the *Percussion*, is a great *Cause* of the *Loudnesse*, as well as the *Strength*: As in a Whip or Wand, if you strike the Aire with it; the Sharper and Quicker you strike it, the *Louder Sound* it giveth. And in playing upon the *Lute*, or *Virginalls*, the quicke Stroke or Touch, is a great life to the *Sound*. The *Cause* is, for that the Quicke Striking cutteth the Aire speedily; whereas the Soft Striking doth rather beat, than cut. 165

Experiments in Consort touching the *Communication* of *Sounds*.

The *Communication* of *Sounds* (as in Bellies of *Lutes*, Empty Vessells, *&c.*) hath beene touched obiter, in the *Majoration* of *Sounds*: But it is fit also to make a *Title* of it apart.

The *Experiment* for greatest Demonstration of *Communication* of *Sounds*, is the *Chiming* of *Bells*; where if you strike with a Hammer upon the Upper Part, and then upon the Midst, and then upon the Lower, you shall finde the *Sound* to be more Treble, and more Base, according unto the Concave, on the Inside; though the Percussion bee onely on the Outside. 166

When the *Sound* is created betweene the *Blast* of the *Mouth*, and the *Aire* of the *Pipe*, it hath nevertheless some *Communication* with the Matter of the Sides of the *Pipe*, and the *Spirits* in them contained; for in a *Pipe*, or *Trumpet*, of Wood, and Brasse, the *Sound* will be divers; So if the *Pipe* be covered with *Cloth*, or *Silke*, it will give a divers *Sound*, from that it would doe of it selfe; So, if the *Pipe* bee a *little wet* on the *Inside*, it will make a differing *Sound*, from the same *Pipe dry*. 167

That *Sound* made within *Water*, doth communicate better with a hard Body thorow *Water*, than made in *Aire*; it doth with *Aire*; *Vide Experimentum*, 134. 168

Experiments in Consort touching *Equality*, and *Inequality* of *Sounds*.

Wee have spoken before (in the *Inquisition* touching *Musicke*,) of *Musicall Sounds*, whereunto there may be a Concord or

Discord in two Parts; Which *Sounds* we call *Tones*; And likewise of *Immusicall Sounds*; And have given the *Cause*, that the *Tone* proceedeth of *Equality*, and the other of *Inequality*. And wee have also expressed there, what are the *Equall Bodies* that give *Tones*, and what are the *Vnequall* that give none. But now we shall speake of such *Inequalitie* of *Sounds*, as proceedeth, not from the Nature of the Bodies themselves, but is Accidentall; Either from the *Roughnesse*, or *Obliquity* of the *Passage*; or from the *Doubling* of the *Percutient*; Or from the *Trepidation* of the *Motion*.

169 A *Bell*, if it have a *Rift* in it, whereby the *Sound* hath not a cleare Passage, giveth a *Hoarse* and *Iarring Sound*; So the *Voice* of *Man*, when by Cold taken the Wesill groweth rugged, and (as we call it) furred, becommeth hoarse. And in these two *Instances*, the *Sounds* are Ingrate; becaus they are meerely *Vnequall*: But, if they be *Vnequall* in *Equality*, then the *Sound* is Gratefull, but Purling.

170 All *Instruments*, that have either *Returnes*, as Trumpets; Or *Flexions*, as Cornets; Or are *Drawne up*, and *put from*, as Sackbuts; have a *Purling Sound*: But the *Recorder*, or *Flute*, that have none of these *Inequalities*, give a cleare *Sound*. Nevertheless, the *Recorder* it selfe, or *Pipe* moistened a little in the Inside, soundeth more solemnly, and with a little Purling, or Hissing. Againe, a *Wreathed String*, such as are in the Base Strings of *Bandoraes*, giveth also a *Purling Sound*.

171 But a *Lute-string*, if it bee meerely *Vnequall* in his Parts, giveth a Harsh and Untuneable *Sound*; which *Strings* wee call *False*, being bigger in one Place than in another; And therefore *Wire-strings* are never *False*. Wee see also, that when we trie a *False Lute-string*, we use to extend it hard betweene the Fingers, and to fillip it; And if it giveth a double *Species*, it is *True*; But if it giveth a treble, or more, it is *False*.

172 *Waters*, in the *Noise* they make as they runne, represent to the Eare a *Trembling Noise*; And in *Regals*, (where they have a *Pipe*, they call the *Nightingale-Pipe*, which containeth *Water*) the *Sound* hath a continuall Trembling: And Children have also little Things they call *Cockes*, which have *Water* in them; And when they blow, or whistle in them, they yeeld a *Trembling Noise*; Which *Trembling* of *Water*, hath an affinitie with the Letter *L*. All which *Inequalities* of *Trepidation*, are rather pleasant, than otherwise.

173 All *Base Notes*, or very *Treble Notes*, give an Asper *Sound*; For that the *Base* striketh more Aire, than it can well strike equally: And the *Treble* cutteth the Aire so sharpe, as it returneth too swift, to make the *Sound* Equall: And therefore a *Meane*, or *Tenor*, is the sweetest Part.

174 We know Nothing, that can at pleasure make a *Musicall*, or *Immusicall Sound*, by voluntary *Motion*, but the *Voyce* of *Man*, and *Birds*. The *Cause* is, (no doubt) in the Weasill or Wind-Pipe, (which we call *Aspera Arteria*,) which being well extended, gathereth *Equality*; As a Bladder that is wrinckled, if it bee extended, becommeth smooth. The Extension is alwayes more in *Tones*, than in *Speech*: Therefore the *Inward Voyce* or *Whisper* can never give a *Tone*: And in *Singing*, there is (manifestly) a greater Working and Labour of the Throat, than in *Speaking*; as appeareth

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in the Thrusting out, or Drawing in of the Chinne, when wee sing.

The *Humming* of *Bees*, is an *Vnequall Buzzing*; And is conceived, by some of the Ancients, not to come forth at their Mouth, but to bee an *Inward Sound*; But (it may be) it is neither; But from the motion of their Wings; For it is not heard but when they stirre. 175

All *Metalls quenched* in *Water*, give a Sibilation or Hissing Sound; (which hath an Affinity with the letter Z.) notwithstanding the *Sound* bee created betweene the *Water* or *Vapour*, and the *Aire*. *Seething* also, if there bee but small Store of *Water*, in a Vessell, giveth a Hissing *Sound*; But *Boyling* in a full Vessell, giveth a Bubling *Sound*, drawing somewhat neare to the *Cocks* used by Children. 176

Triall would be made, whether the *Inequality*, or Interchange of the *Medium*, will not produce an *Inequality* of *Sound*; As if three *Bells* were made one within another, and Aire betwixt each; And then the outermost *Bell* were chimed with a Hammer, how the *Sound* would differ from a Simple *Bell*. So likewise, take a *Plate* of *Brasse*, and a *Plancke* of *Wood*, and joyne them close together, and knock upon one of them, and see if they doe not give an *unequall Sound*. So make two or three *Partitions* of *Wood* in a *Hogshead*, with *Holes* or *Knots* in them; And marke the difference of their *Sound*, from the *Sound* of an *Hogshead*, without such *Partitions*. 177

Experiments in Consort touching the *more Treble*, and the *more Base Tones*, or *Musicall Sounds*.

IT is evident, that the *Percussion* of the *Greater Quantity of Aire*, causeth the *Baser Sound*; And the lesse *Quantity*, the more *Treble Sound*. The *Percussion* of the *Greater Quantity of Aire*, is produced by the *Greatnesse of the Body Percussing*; By the *Latitude* of the *Concave*, by which the *Sound* passeth; and by the *Longitude* of the same *Concave*. Therefore we see that a *Base string*, is greater than a *Treble*; A *Base Pipe* hath a greater Bore than a *Treble*; And in *Pipes*, and the like, the lower the Note Holes be, and the further off from the Mouth of the *Pipe*, the more *Base Sound* they yeeld; And the nearer the Mouth, the more *Treble*. Nay more, if you strike an *Entire Body*, as an *Andiron* of *Brasse*, at the Top, it maketh a more *Treble Sound*; And at the Bottome a *Baser*. 178

It is also evident, that the *Sharper* or *Quicker Percussion of Aire* causeth the more *Treble Sound*; And the *Slower* or *Heavier*, the more *Base Sound*. So we see in *Strings*; the more they are wound up, and strained; (And thereby give a more quick Start-backe;) the more *Treble* is the *Sound*; And the slacker they are, or lesse wound up, the *Baser* is the *Sound*. And therefore a Bigger *String* more strained, and a Lesser *String*, lesse strained, may fall into the same *Tone*. 179

Children, *Women*, *Eunuchs* have more small and shrill *Voyces*, than *Men*. The Reason is, not for that *Men* have greater Heat, which may make the *Voyce* stronger, (for the strength of a *Voyce* or *Sound*, doth make a difference in the *Loudnesse* or *Softnesse*, but not in the *Tone*;) But from the Dilatation of the Organ; which (it is true) is likewise caused by Heat. But the Cause of *Changing* the *Voyce*, at the yeares of Puberty, is more obscure. It seemeth to be, for that when much of the Moysture of the Body, which did before irrigate the Parts, is drawne down to the Spermaticall vessels; it leaveth the Body more hot than it was; whence commeth the Dilatation of the Pipes: For we see plainly, all Effects of Heat, doe then come on; As Pilositie, more Roughnesse of the Skinne, Hardnesse of the Flesh, &c. 180

The Industry of the *Musitian*, hath produced two other Meanes of *Straining*, or *Intension* of *Strings*, besides their *winding up*. The one is the *Stopping* of 181

of the *String* with the *Finger*; As in the Necks of Lutes, Viols, &c. The other is the *Shortneſſe* of the *String*; As in Harps, Virginalls, &c. Both theſe have one, and the ſame reaſon; For they cauſe the *String* to give a quicker Start.

182 In the *Straining* of a *String*, the further it is ſtrained, the leſſe *Superſtraining* goeth to a *Note*; For it requireth good Winding of a String, before it will make any Note at all: And in the Stops of Lutes, &c. the higher they goe, the leſſe Diſtance is betweene the Frets.

183 If you fill a *Drinking Glaſſe* with *Water*, (eſpecially one Sharp below, and Wide above,) and fillip upon the Brim, or Out-ſide; And after empty Part of the *Water*, and ſo more and more, and ſtill trie the *Tone* by Fillipping; you ſhall finde the *Tone* fall, and be more *Baſe*, as the *Glaſſe* is more Empty.

Experiments in Conſort touching the *Proportion* of *Treble* and *Baſe Tones*.

The Juſt and Meaſured *Proportion* of the *Aire Percuſſed*, towards the *Baſeneſſe* or *Trebleneſſe* of *Tones*, is one of the greateſt Secrets in the Contemplation of *Sounds*. For it diſcovereth the true *Coincidence* of *Tones* into *Diapaſons*; Which is the Returne of the ſame *Sound*. And ſo of the *Concords* and *Diſcords*, between the *Vniſon*, and *Diapaſon*; Which we have touched before, in the *Experiments* of *Muſicke*; but thinke fit to reſume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may bee found out in the *Proportion* of the *Winding* of *Strings*; In the *Proportion* of the *Diſtance* of *Frets*; And in the *Proportion* of the *Concave* of *Pipes*, &c. But moſt commodiouſly in the laſt of theſe.

184 Trie therefore the *Winding* of a *String* once about, as ſoon as it is brought to that Extenſion, as will give a *Tone*; And then of twice about; And thrice about, &c. And mark the Scale or Difference of the Riſe of the *Tone*: Whereby you ſhall diſcover, in one, two Effects; Both the *Proportion* of the *Sound* towards the *Dimenſion* of the *Winding*; And the *Proportion* likewiſe of the *Sound* towards the *String*, as it is more or leſſe ſtrained. But note that to meaſure this, the way will be, to take the Length in a right Line of the *String*, upon any Winding about of the Pegge.

185 As for the *Stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the firſt Stop of the *String*, unto ſuch a Stop as ſhall produce a *Diapaſon* to the former Stop, upon the ſame *String*.

186 But it will beſt (as it is ſaid) appeare, in the *Bores* of *Wind-Inſtruments*: And therefore cauſe ſome halfe dozen *Pipes*, to bee made, in length, and all things elſe, alike, with a ſingle, double, and ſo on to a ſextuple *Bore*; And ſo marke what Fall of *Tone* every one giveth. But ſtill in theſe three laſt *Inſtances*, you muſt diligently obſerve, what *length* of *String*, or *Diſtance* of *Stop*, or *Concave* of *Aire*, maketh what *Riſe* of *Sound*. As in the laſt of theſe (which (as we ſaid) is that, which giveth the apteſt demonſtration,) you muſt ſet downe what Encreaſe of *Concave* goeth to the making of a *Note* higher; And what of two *Notes*; And what of three *Notes*; And ſo up to the *Diapaſon*: For then the great Secret of *Numbers* and *Proportions*, will appeare. It is not unlike, that thoſe that make *Recorders*, &c. know this already: for that they make them in *Sets*. And likewiſe *Bell-founders* in fitting

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the tune of their *Bells*. So that Enquiry may save Triall. Surely, it hath been observed by one of the *Ancients*, that an *Empty Barrell* knocked upon with the finger, giveth a *Diapason* to the *Sound* of the like *Barrell full*; But how that should be, I doe not well understand; For that the knocking of a *Barrell, full* or *Emptie*, doth scarce give any *Tone*.

There is required some sensible Difference in the *Proportion* of creating a *Note*, towards the *Sound* it selfe, which is the Passive: And that it bee not too neare, but at a distance. For in a *Recorder*, the three uppermost Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the first three. And the like (no doubt) is required in the Winding or Stopping of *Strings*. 187

There is another Difference of *Sounds*, which wee will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Base*, nor *Treble*: Nor it is not *Musicall*, nor *Immusicall*: Though it bee true, that there can bee no *Tone* in an *Interiour Sound*: But on the other side, in an *Exteriour Sound*, there may bee both *Musicall* and *Immusicall*. Wee shall therefore enumerate them, rather than precisely distinguish them; Though (to make some Adumbration of that wee meane) the *Interiour* is rather an *Impulsion* or *Contusion* of the *Aire*, than an *Elision* or *Section* of the same. So as the *Percussion* of the one, towards the other, differeth, as a *Blow* differeth from a *Cut*. Experiments in Consort touching *Exteriour*, and *Interiour Sounds*

In *Speech* of *Man*, the *Whispering*, (which they call *Susurrus* in *Latine*,) whether it be louder or softer, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therefore you can never make a *Tone*, nor sing in *Whispering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellowes*, or *Wind*, (though lowd) is an *Interiour Sound*; But the *Blowing* thorow a *Pipe*, or *Concave*, (though soft) is an *Exteriour*. So likewise the greatest *Winds*, if they have no Coarctation, or blow not hollow, give an *Interiour Sound*; The Whistling or hollow *Wind* yeeldeth a Singing, or *Exteriour Sound*; The former being pent by some other Body; The later being pent in by his own Densitie: And therefore we see, that when the *Wind* bloweth hollow, it is a Signe of Raine. The *Flame*, as it moveth within it selfe, or is blowne by a *Bellowes*, giveth a Murmur or *Interiour Sound*. 188

There is no *Hard Body*, but strucke against another *Hard Body*, will yeeld an *Exteriour Sound*, greater or lesser: In so much as if the Percussion be oversoft, it may induce a Nullity of *Sound*; But never an *Interiour Sound*; As when one treadeth so softly, that hee is not heard. 189

Where the *Aire* is the *Percutient*, pent, or not pent, against a *Hard Body*, it never giveth an *Exteriour Sound*; As if you blow strongly with a Bellowes against a Wall. 190

Sounds (both *Exteriour* and *Interiour*,) may be made, as well by *Suction*, as by *Emission* of the *Breath*: As in *Whistling*, or *Breathing*. 191

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Experiments in Consort touching *Articulation of Sounds.*

192 IT is evident, and it is one of the ſtrangeſt Secrets in *Sounds*, that the *whole Sound* is not in the *whole Aire* onely; But the *whole Sound* is alſo in every ſmall *Part* of the *Aire*. So that all the curious Diverſitie of *Articulate Sounds*, of the Voyce of Man, or Birds, will enter at a ſmall Cranny, Inconfuſed.

193 The *Vnequall Agitation* of the *Winds*, and the like, though they be materiall to the Carriage of the *Sounds*, further or leſſe way; yet they doe not confound the *Articulation* of them at all, within that diſtance that they can be heard; Though it may be, they make them to be heard leſſe Way, than in a Still; as hath beene partly touched.

194 Over-great Diſtance confoundeth the *Articulation* of *Sounds*; As we ſee, that you may heare the *Sound* of a Preachers voyce, or the like, when you cannot diſtinguiſh what he ſaith. And one *Articulate Sound* will confound another; as when many ſpeake at once.

195 In the *Experiment* of *Speaking under Water*, when the Voyce is reduced to ſuch an Extreme Exilitie, yet the *Articulate Sounds*, (which are the *Words*) are not confounded; as hath beene ſaid.

196 I conceive, that an *Extreme Small*, or an *Extreme Great Sound*, cannot bee *Articulate*; But that the *Articulation* requireth a *Mediocrity* of *Sound:* For that the *Extreme Small Sound* confoundeth the *Articulation* by *Contracting*; And the *Great Sound*, by *Diſperſing:* And although (as was formerly ſaid) a *Sound Articulate*, already created, will be contracted into a ſmall Cranny; yet the firſt *Articulation* requireth more Dimenſion.

197 It hath beene obſerved, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewiſe in the Roofe, a Preacher cannot be heard ſo well, as in the like Places not ſo Vaulted. The Cauſe is, for that the *Subſequent Words* come on, before the *Precedent Words* vaniſh: And therefore the *Articulate Sounds* are more confuſed, though the Groſſe of the *Sound* be greater.

198 The *Motions* of the *Tongue*, *Lips*, *Throat*, *Pallat*, &c. which goe to the *Making* of the ſeverall *Alphabeticall Letters*, are worthy Enquiry, and pertinent to the preſent *Inquiſition* of *Sounds:* But becauſe they are ſubtill, and long to deſcribe, we will referre them over, and place them amongſt the *Experiments* of *Speech*. The *Hebrewes* have beene diligent in it, and have aſſigned, which *Letters* are *Labiall*, which *Dentall*, which *Gutturall*, &c. As for the *Latines*, and *Grecians*, they have diſtinguiſhed betweene *Semi-vowels*, and *Mutes*; And in *Mutes*, betweene *Mutæ Tenues*, *Mediæ*, and *Aſpiratæ*; Not amiſſe; But yet not diligently enough. For the ſpeciall *Stroakes*, and *Motions*, that create thoſe *Sounds*, they have little enquired: As that the *Letters*, *B. P. F. M.* are not expreſſed, but with the *Contracting*, or *Shutting* of the *Mouth*; That the *Letters*, *N.* and *B.* cannot bee pronounced, but that the *Letter*, *N.* will turne into *M.* As *Hecatonba*, will bee *Hecatomba*. That *M.* and *T.* cannot bee pronounced together; but *P.* will come betweene; as *Emtus*, is pronounced *Emptus*; And a Number of the like. So that if you enquire to the full; you will finde, that to the Making of the whole *Alphabet*, there will be fewer *Simple Motions* required, than there are *Letters*.

199 The *Lungs* are the moſt Spongy Part of the Body; And therefore ableſt to contract, and dilate it ſelfe; And where it contracteth it ſelfe, it expelleth the *Aire*; which thorow the *Artire*, *Throat*, and *Mouth*, maketh the *Voyce:* But yet *Articulation* is not made, but with the

the helpe of the *Tongue*, *Pallate*, and the reſt of thoſe they call *Inſtruments* of *voyce*.

There is found a Similitude, betweene the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that have no *Voyce Articulate*; and divers *Letters* of *Articulate Voyces*: And commonly Men have given ſuch Names to thoſe *Sounds*, as doe allude unto the Articulate Letters. As *Trembling* of *Water* hath Reſemblance with the *Letter L*; *Quenching* of *Hot Metalls*, with the *Letter Z*; *Snarling* of *Dogs*, with the *Letter R*; The *Noiſe* of *Scritch-Owles*; with the *Letter Sh*; *Voyce* of *Cats*, with the *Dypthong Eu*; *Voyce* of *Cuckoes*, with the *Dypthong Ou*; *Sounds* of *Strings*, with the *Letter Ng*: So that if a Man, (for Curioſity, or Strangeneſſe ſake,) would make a *Puppet* or other Dead Body, to pronounce a *Word*; Let him conſider, on the one Part, the Motion of the *Inſtruments* of *Voyce*; and on the other part the like *Sounds* made in *Inanimate Bodies*; And what Conformitie there is that cauſeth the Similitude of *Sounds*; And by that he may miniſter light to that Effect. 200

NA-

NATVRALL HISTORIE.

III. Century.

ALL *Sounds* (whatsoever) move Round; That is to say; On *all Sides*; *Vpwards*; *Downwards*; *Forwards*; and *Backwards*. This appeareth in all *Instances*.

201 Experiments in Consort, touching the *Motions* of *Sounds*, in what *Lines* they are *Circular*, *Oblique*, *Straight*; *Vpwards*, *downwards*; *Forwards*, *Backwards*.

Sounds doe not require to be conveyed to the *Sense*, in a *Right Line*, as *Visibles* doe, but may bee *Arched*; Though it be true, they move strongest in a *Right Line*; Which nevertheless is not caused by the *Rightnesse* of the *Line*, but by the Shortnesse of the distance; *Linea recta brevissima*. And therefore we see, if a *Wall* be betweene, and you speake on the one Side, you heare it on the other; Which is not because the *Sound* Passeth thorow the *Wall*; but *Archeth* over the *Wall*.

202

If the *Sound* be *Stopped* and *Repercussed*, it commeth about on the other Side, in an *Oblique Line*. So, if in a *Coach*, one side of the Boot bee downe, and the other up; And a Begger beg on the Close Side; you would thinke that he were on the Open Side. So likewise, if a *Bell* or *Clock*, bee (for Example) on the North-side of a Chamber; And the Window of that Chamber be upon the South; Hee that is in the Chamber will thinke the *Sound* came from the South.

203

Sounds, though they *spread round*, (so that there is an *Orbe*, or *Spherical Area* of the *Sound*;) yet they move strongest, and goe furthest in the *Fore-Lines*, from the first Locall Impulsion of the Aire. And therefore in *Preaching*, you shall heare the *Preachers* Voyce, better, before the Pulpit, than behind it, or on the Sides, though it stand open. So a *Harquebuz*, or *Ordinance*, will bee further heard, forwards, from the Mouth of the *Peece*, than backwards, or on the Sides.

204

It may be doubted, that *Sounds* doe move better Downwards, than Upwards. *Pulpits* are placed high above the People. And when the Ancient *Generalls* spake to their Armies, they had ever a Mount of Turfe cast up, whereupon they stood: But this may be imputed to the Stops and Obstacles, which the voyce meeteth with, when one speaketh upon the levell. But

205

there seemeth to be more in it: For it may be, that *Spirituall Spices*, both of *Things Visible* and *Sounds*, doe move better *Downwards* than *Vpwards*. It is a strange Thing, that to Men standing below on the Ground, those that be on the Top of Pauls, seem much lesse than they are, and cannot be knowne; But to Men above, those below seeme nothing so much lessened, and may be knowne: yet it is true, that all things to them above, seeme also somewhat contracted, and better collected into Figure: as *Knots* in *Gardens* shew best from an Upper window, or Tarras.

206 But to make an exact Triall of it, let a Man stand in a *Chamber*, not much above the Ground, and speake out at the window, thorow a *Trunke*, to one standing on the Ground, as softly as he can, the other laying his Eare close to the *Trunke*: Then *via versa*, let the other speake *below* keeping the same Proportion of Softnesse; And let him in the *Chamber* lay his Eare to the *Truncke*: And this may be the apteſt Meanes, to make a Judgement, whether *Sounds* descend, or ascend, better.

Experiments in Consort, touching the *Lasting* and *Perishing* of *Sounds*; And touching the *Time* they require to their *Generation*, or *Delation*.

207 After that *Sound* is created, (which is in a moment,) wee finde it continueth some small time, melting by little and little. In this there is a wonderfull Errour amongst Men, who take this to bee a *Continuance* of the First *Sound*; whereas (in truth) it is a *Renovation*, and not a *Continuance*: For the *Body percussed*, hath by reason of the *Percussion*, a *Trepidation* wrought in the *Minute Parts*; and so reneweth the *Percussion* of the *Aire*. This appeareth manifestly, because that the Melting *Sound* of a Bell, or of a String strucken, which is thought to be a *Continuance*, ceaseth as soone as the Bell or String are touched. As in a Virginall, as soone as ever the Jacke falleth, and toucheth the String, the Sound ceaseth; And in a Bell, after you have chimed upon it, if you touch the Bell, the *Sound* ceaseth. And in this you must distinguish that there are two *Trepidations*: The one Manifest, and Locall; As of the Bell, when it is Pensile: The other Secret, of the Minute Parts; such as is described in the ninth Instance. But it is true, that the *Locall* helpeth the *Secret* greatly. We see likewise that in Pipes, and other winde Instruments, the *Sound* lasteth no longer, than the breath bloweth. It is true, that in Organs, there is a confused Murmur for a while; after you have plaied; But that is but while the Bellowes are in Falling.

208 It is certaine, that in the *Noise* of great *Ordnance*, where many are shot off together, the *Sound* will bee carried, (at the least) twenty Miles upon the land, and much further upon the Water. But then it will come to the Eare; Not in the Instant of the Shooting off, but it will come an Houre, or more later. This must needs be a *Continuance* of the *First Sound*; For there is no *Trepidation* which should renew it. And the Touching of the *Ordnance* would not extinguish the *Sound* the sooner: So that in great *Sounds* the *Continuance* is more then Momentany.

209 To try exactly the time wherein *Sound* is *Delated*, Let a Man stand in a Steeple, and have with him a Taper; And let some vaile be put before the Taper; And let another Man stand in the Field a Mile off. Then let him in the Steeple strike the Bell; And in the same instant withdraw the Vaile; And so let him in the Field tell by his Pulse what distance of *Time* there is betweene the *Light seene*, and the *Sound heard*: For it is certaine that the *Delation* of Light is in an Instant. This may be tried in farre greater Distances, allowing greater *Lights* and *Sounds*.

210 It is generally knowne and observed, that *Light*, and the *Object* of *Sight*, move swifter than *Sound*; For we see the *Flash* of a Peece is seene sooner, than

than the *Noise* is heard. And in Hewing Wood, if one be some distance off, he shall see the Arme lifted up for a second Stroke, before he heare the *Noise* of the first. And the greater the Distance, the greater is the Prevention: As we see in Thunder, which is farre off; where the Lightning precedeth the Crack a good space.

211 *Colours*, when they represent themselves to the Eye, fade not, nor melt not by Degrees, but appeare still in the same Strength; But *Sounds* melt, and vanish, by little and little. The Cause is, for that *Colours* participate nothing with the *Motion* of the *Aire*; but *Sounds* doe. And it is a plaine Argument, that *Sound* participateth of some *Locall Motion*, of the *Aire*, (as a Cause *Sine quâ non*,) in that, it perisheth so suddenly; For in every Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it self; which the *Water* also doth, but nothing so swiftly.

Experiments in Consort touching the *Passage* and *Interceptions* of *Sounds*.

In the Trials of the *Passage*, or *Not Passage* of *Sounds*, you must take heed, you mistake not the *Passing By the sides* of a Body, for the *Passing thorow* a Body: and therefore you must make the *Intercepting* Body very close; For *Sound* will passe thorow a small Chinck.

212 Where *Sound* passeth thorow a *Hard*, or *Close Body* (as thorow *Water*; thorow a *Wall*; thorow *Metall*, as in Hawkes Bels stopped, &c.) the *Hard*, or *Close Body*, must be but thinne and small; For else it deadeth and extinguisheth the *Sound* utterly. And therefore, in the *Experiment* of *Speaking in Aire under Water*, the voice must not be very deepe within the *Water*: For then the *Sound* pierceth not. So if you speak on the further side of a *Close Wall*, if the *Wall* be very thick, you shall not be heard: And if there were an Hogshead empty, whereof the Sides were some two Foot thick, and the Bunghole stopped; I conceive the Resounding Sound, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none: But only you shall heare the *Noise* of the Outward Knock, as if the Vessell were full.

213 It is certaine, that in the *Passage* of *Sounds* thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the Hard body it selfe, doth cooperate; But much better, when the Sides of that *Hard Body* are struck, than when the Percussion is only within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes stopped up, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax; and then shake the Glasse, and see whether the Bell give any *Sound* at all, or how weak? But note, that you must in stead of the Threed, take a Wire; or else let the Glasse have a great Belly; lest when you shake the Bell, it dash upon the Sides of the Glasse.

214 It is plaine, that a very *Long*, and *Downe-right Arch*, for the *Sound* to passe, will extinguish the *Sound* quite; So that that *Sound*, which would be heard over a Wall, will not be heard over a Church; Nor that *Sound*, which will be heard, if you stand some distance from the Wall, will be heard if you stand close under the Wall.

215 *Soft* and *Foraminous Bodies*, in the *first Creation* of the *Sound*, will dead it; For the striking against Cloth, or Furre, will make little *Sound*; As hath beene said: But in the *Passage* of the *Sound*, they will admit it better than *Harder Bodies*; As we see, that Curtaines, and Hangings, will not stay the *Sound* much; But Glasse-windowes, if they be very Close, will check a

Sound more, than the like Thickneſſe of Cloth. We ſee alſo, in the Rumbling of the Belly, how eaſily the *Sound* paſſeth thorow the Guts, and Skin.

216 It is worthy the Enquiry, whether *Great Sounds*, (As of Ordnance, or Bels) become not more *Weak* and *Exile*, when they paſſe thorow *Small Crannies*. For the *Subtilties* of *Articulate Sounds*, (it may be) may paſſe thorow *Small Crannies*, not confuſed; But the *Magnitude* of the *Sound* (perhaps,) not ſo well.

Experiments in Conſort, touching the *Medium* of *Sounds*.

THe *Mediums* of *Sounds* are *Aire*; *Soft* and *Porous Bodies*; Alſo *Water*. And *Hard Bodies* refuſe not altogether to be *Mediums* of *Sounds*. But all of them are dull and unapt *Deferents*, except the *Aire*.

217 In *Aire*, the Thinner or Drier *Aire*, carrieth not the *Sound* ſo well, as the more Denſe; As appeareth in *Night Sounds*; And *Evening Sounds*; And

218 *Sounds* in moiſt Weather, and Southerne Winds. The reaſon is already mentioned in the *Title* of *Majoration* of *Sounds*; Being for that *Thin Aire* is better pierced; but *Thick Aire* preſerveth the *Sound* better from Waſte; Let further Triall be made by Hollowing in Miſts, and Gentle Showers: For (it may be) that will ſomewhat dead the *Sound*.

219 How farre forth *Flame* may be a *Medium* of *Sounds*, (eſpecially of ſuch *Sounds* as are created by *Aire*, and not betwixt *Hard Bodies*) let it be tried, in *Speaking* where a *Bonfire* is betweene; But then you muſt allow for ſome diſturbance, the *Noiſe* that the *Flame* it ſelfe maketh.

220 Whether any other *Liquours*, being made *Mediums*, cauſe a diverſity of *Sound* from *Water*, it may be tried: As by the Knapping of the Tongs; Or Striking the Bottome of a Veſſell, filled either with Milk, or with Oile; which though they be more light, yet are they more unequall Bodies than Aire.

Of the Natures *of the* Mediums, *we have now ſpoken*; *As for the* Diſpoſition *of the ſaid* Mediums, *it doth conſiſt in the Penning, or not Penning of the* Aire; *Of which we have ſpoken before, in the* Title *of* Delation *of* Sounds: *It conſiſteth alſo in the* Figure *of the* Concave, *through which it paſſeth*; *Of which we will ſpeak next.*

Experiments in Conſort what the *Figures* of the *Pipes*, or *Concaves*, or the *Bodies Deferent* conduce to the *Sounds*.

How the *Figures* of *Pipes*, or *Concaves*, through which *Sounds* paſſe; Or of other *Bodies deferent*; conduce to the Variety and Alteration of the *Sounds*; Either in reſpect of the *Greater Quantity*, or *leſſe Quantity* of *Aire*, which the *Concaves* receive; Or in reſpect of the *Carrying* of *Sounds* longer or ſhorter way; Or in reſpect of many other *Circumſtances*; they have beene touched, as falling into other *Titles*. But thoſe *Figures*, which we now are to ſpeak of, we intend to be, as they concerne the *Lines*, through which *Sound* paſſeth; As *Straight*; *Crooked*; *Angular*; *Circular*; *&c.*

221 The *Figure* of a *Bell* partaketh of the *Pyramis*, but yet comming off, and dilating more ſuddenly. The *Figure* of a *Hunters Horne*, and *Cornet*, is oblique; yet they have likewiſe *Straight Hornes*; which if they be of the ſame Bore with the *Oblique*, differ little in *Sound*; ſave that the Straight require ſomewhat a ſtronger Blaſt. The *Figures* of *Recorders*, and *Flutes*, and *Pipes* are ſtraight; But the *Recorder* hath a leſſe Bore, and a greater; Above, and below. The *Trumpet* hath the *Figure* of the *Letter S:* which maketh that

Purling

Purling *Sound*, &c. Generally, the *Straight Line* hath the cleaneſt and roundeſt *Sound*, And the *Crooked* the more Hoarſe, and Jarring.

222 Of a *Sinuous pipe*, that may have ſome foure Flexions, Triall would be made. Likewiſe of a *Pipe*, made like a *Croſſe*, open in the middeſt. And ſo likewiſe of an *Angular Pipe*: And ſee what will be the Effects of theſe ſeverall *Sounds*. And ſo againe of a *Circular Pipe*; As if you take a *Pipe* perfect Round, and make a Hole whereinto you ſhall blow; And another Hole not farre from that; But with a Traverſe or Stop between them; So that your Breath may goe the Round of the *Circle*, and come forth at the ſecond Hole. You may trie likewiſe *Percuſſions* of *Solid Bodies* of ſeverall *Figures*; As *Globes*, *Flats*, *Cubes*, *Croſſes*, *Triangles*, &c. And their *Combinations*; As *Flat* againſt *Flat*; And *Convex* againſt *Convex*; And *Convex* againſt *Flat*, &c. And mark well the diverſities of the *Sounds*. Trie alſo the difference in *Sound* of ſeverall *Craſitudes* of *Hard Bodies* percuſſed; And take knowledge of the diverſities of the *Sounds*. I my ſelfe have tried, that a *Bell* of *Gold* yeeldeth an excellent *Sound*, not inferiour to that of *Silver*, or *Braſſe*, but rather better: yet we ſee that a piece of Money of *Gold* ſoundeth farre more flat than a peece of Money of *Silver*.

223 The *Harpe* hath the *Concave*, not along the *Strings*, but acroſſe the *Strings*; And no *Inſtrument* hath the *Sound* ſo Melting, and Prolonged, as the *Iriſh Harpe*. So as I ſuppoſe, that if a *Virginall* were made with a double *Concave*; the one all the length as the *Virginall* hath; the other at the End of the *Strings*, as the *Harpe* hath; It muſt needs make the *Sound* perfecter, and not ſo Shallow, and Jarring. You may trie it, without any Sound-Board along, but onely Harp-wiſe, at one End of the *Strings*: Or laſtly with a double *Concave*, at Each end of the *Strings* one.

Experiments in Conſort, touching the *Mixture* of *Sounds*.

224 THere is an apparent Diverſitie between the *Species Viſible*, and *Audible*, in this; That the *Viſible* doth not *mingle* in the *Medium*, but the *Audible* doth. For if we looke abroad, we ſee Heaven, a number of Starres, Trees, Hills, Men, Beaſts, at once. And the *Species* of the one doth not confound the other. But if ſo many *Sounds* come from ſeverall Parts, one of them would utterly confound the other. So we ſee, that *Voyces* or *Conſorts* of *Muſick* doe make an Harmony by *Mixture*, which *Colours* doe not. It is true nevertheleſſe, that a great *Light* drowneth a ſmaller, that it cannot be ſeene; As the *Sunne* that of a *Gloworme*; as well as a Great *Sound* drowneth a leſſer. And I ſuppoſe likewiſe, that if there were two Lanthornes of Glaſſe, the one a Crimſin, and the other an Azure, and a Candle within either of them, thoſe Coloured Lights would mingle and caſt upon a White Paper a Purple Colour. And even in *Colours*, they yeeld a faint and weak *Mixture*: For white walls make Roomes more lightſome than black, &c. But the Cauſe of the *Confuſion* in *Sounds*, and the *Inconfuſion* in *Species Viſible*, is, For that the *Sight* worketh in Right Lines, and maketh ſeverall *Cones*; And ſo there can be no Coincidence in the Eye, or Viſuall Point: But *Sounds*, that move in Oblique and Arcuate Lines, muſt needs encounter, and diſturbe the one the other.

225 The ſweeteſt and beſt *Harmony* is, when every *Part*, or *Inſtrument*, is not heard by it ſelfe, but a Conflation of them all; Which requireth to ſtand ſome diſtance off. Even as it is in the *Mixture* of Perfumes; Or the Taking of the Smels of ſeverall *Flowers* in the *Aire*.

226 The *Diſpoſition* of the *Aire*, in other *Qualities*, except it be joyned with *Sound*, hath no great Operation upon *Sounds*: For whether the *Aire* bee

lightsome or darke, hot or cold, quiet or stirring, (except it be with *Noise*) sweet-smelling, or stinking, or the like; it importeth not much: Some petty Alteration or difference it may make.

227 But *Sounds* doe disturbe and alter the one the other: Sometimes the one drowning the other, and making it not heard; Sometimes the one jarring and discording with the other, and making a Confusion; Sometimes the one Mingling and Compounding with the other, and making an Harmony.

228 Two *Voices* of like *lowdnesse*, will not be heard, twice as farre, as one of them alone; And two *Candles* of like light, will not make Things seeme twice as farre off, as one. The Cause is profound; But it seemeth that the *Impressions* from the *Objects* of the *Senses*, doe *mingle* respectively, every one with his kinde; But not in proportion, as is before demonstrated: And the reason may be, because the first *Impression*, which is from *Privative* to *Active*, (As from *Silence* to *Noise*, or from *Darknesse* to *Light*,) is a greater Degree, than from *Lesse Noise*, to *More Noise*, or from *Lesse Light* to *More Light*. And the Reason of that againe may be; For that the *Aire*, after it hath received a Charge, doth not receive a Surcharge, or greater Charge, with like Appetite, as it doth the first Charge. As for the Encrease of Vertue, generally, what Proportion it beareth to the Encrease of the Matter, it is a large Field, and to be handled by it selfe.

Experiments in Consort touching *Melioration* of *Sounds*.

ALL *Reflexions Concurrent* doe make *Sounds* Greater; But if the Body that createth, either, the Originall *Sound*, or the *Reflexion*, be clean and smooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Violl*, with the Belly of polished Brasse, in stead of Wood. We see that even in the Open Aire, the *Wire String* is sweeter, than the *String* of *Guts*. And we see that for *Reflexion*, *Water* excelleth; As in *Musick* near the *Water*; Or in *Eccho's*.

230 It hath been tryed, that a *Pipe* a little moistned on the inside, but yet so as there be no Drops left, maketh a more solemne *Sound*, than if the *Pipe* were dry: But yet with a sweet Degree of *Sibillation*, or *Purling*; As we touched it before in the title of *Equality*. The Cause is, for that all Things Porous, being superficially wet, and (as it were) between drie and wet, become a little more Even and Smooth; But the Purling, (which must needs proceed of Inequalitie,) I take to be bred between the Smoothnesse of the inward Surface of the *Pipe*, which is wet; And the Rest of the Wood of the *Pipe*, unto which the Wet commeth not, but it remaineth drie.

231 In *Frosty Weather*, *Musick* within doors soundeth better. Which may be, by reason, not of the Disposition of the *Aire*, but of the *Wood* or *String* of the *Instrument*, which is made more Crispe, and so more porous and hollow: And we see that *Old Lutes* sound better than *New*, for the same reason. And so doe *Lute-strings* that have been kept long.

232 *Sound* is likewise *Meliorated* by the *Mingling* of *Open Aire* with *Pent Aire*; Therefore Triall may be made, of a *Lute* or *Violl* with a double Belly; Making another Belly with a Knot over the Strings; yet so, as there bee Room enough for the Strings, and Room enough to play below that Belly. Triall may be made also of an *Irish Harpe*, with a Concave on both Sides; whereas it useth to have it but on one Side. The doubt may be, lest it should make too much Resounding; whereby one Note would overtake another.

233 If you sing in the Hole of a *Drum*, it maketh the *Singing* more sweet. And so I conceive it would, if it were a *Song* in Parts, sung into severall *Drums*; And for handsomnesse and strangenesse sake, it would not be amisse to have a Curtain between the Place, where the *Drums* are, and the *Hearers*.

When

When a *Sound* is created in a *Wind-Instrument*, between the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Body of the *Pipe*, it *meliorateth* the *Sound*. For (no doubt) there would be a differing *Sound* in a Trumpet, or *Pipe* of *Wood*; And again in a *Trumpet* or *Pipe* of *Brasse*. It were good to trie *Recorders* & *Hunters Hornes* of *Brasse*, what the *Sound* would be. 234

Sounds are *meliorated* by the *Intension* of the *Sense*, where the *Common Sense* is collected most, to the *particular Sense* of *Hearing*, and the *Sight* suspended: And therefore, *Sounds* are sweeter, (as well as greater,) in the *Night*, than in the *Day*; And I suppose, they are sweeter to blinde Men, than to Others: And it is manifest, that betweene *Sleeping* and *Waking*, (when all the *Senses* are bound and suspended) *Musick* is farre sweeter, than when one is *fully Waking*. 235

IT is a Thing strange in Nature, when it is attentively considered; How *Children*, and some *Birds*, learne to *imitate Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that speaketh; For *Birds* are as well taught in the Darke, as by Light. The *Sounds* of *Speech* are very Curious and Exquisite: So one would thinke it were a Lesson hard to learne. It is true, that it is done with time, and by little and little, and with many Essayes and Proffers: But all this dischargeth not the Wonder. It would make a Man think (though this which we shall say may seeme exceeding strange) that there is some *Transmission* of Spirits; and that the *Spirits* of the *Teacher* put in Motion, should worke with the *Spirits* of the *Learner*, a Pre-disposition to offer to *Imitate*; And so to perfect the *Imitation* by degrees. But touching *Operations* by *Transmissions* of *Spirits*, (which is one of the highest secrets in Nature,) we shall speake in due place; Chiefly when we come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a pre-disposition to *Imitate*. We see how ready Apes and Monkies are, to *imitate* all Motions of Man: And in the Catching of Dottrells, we see, how the Foolish Bird playeth the Ape in Gestures: And no Man (in effect) doth accompany with others, but he learneth, (ere he is aware,) some Gesture, or Voice, or Fashion of the other. Experiments in Consort, touching the *Imitation* of *Sounds*. 236

In *Imitation* of *Sounds*, that *Man* should be the *Teacher*, is no Part of the Matter; For *Birds* will learne one of another; And there is no Reward, by feeding, or the like, given them for the *Imitation*; And besides, you shall have Parrots, that will not onely *imitate* Voices, but Laughing, Knocking, Squeaking of a Doore upon the Hinges, or of a Cart-wheele; And (in effect) any other *Noise* they heare. 237

No *Beast* can *imitate* the *Speech* of *Man*, but *Birds* onely; For the Ape it selfe, that is so ready to *imitate* otherwise, attaineth not any degree of *Imitation* of Speech. It is true, that I have known a Dog, that if one howled in his Eare, he would fall a howling a great while. What should be the Aptnesse of *Birds*, in comparison of *Beasts*, to *imitate* the *Speech* of *Man*, may be further enquired. Wee see that *Beasts* have those Parts, which they count the *Instruments* of *Speech*, (as *Lips*, *Teeth*, &c.) liker unto *Man*, than *Birds*. As for the *Necke*, by which the *Throat* passeth; we see many *Beasts* have it, for the Length, as much as *Birds*. What better *Gorge*, or Attire, *Birds* have, may be further enquired. The *Birds* that are knowne to be Speakers, are, *Parrats*, *Pyes*, *Iayes*, *Dawes*, and *Ravens*. Of which *Parrats* have an adunque Bill, but the rest not. 238

But I conceive, that the *Aptnesse* of *Birds*, is not so much in the *Conformity* of the *Organs* of *Speech*, as in their *Attention*. For *Speech* must come by *Hearing*, 239

Hearing, and *Learning*; And *Birds* give more heed, and marke *Sounds*, more than *Beaſts*; Becauſe naturally they are more delighted with them, and practiſe them more; As appeareth in their *Singing*. We ſee alſo, that thoſe that teach *Birds* to ſing, doe keep them Waking, to increaſe their *Attention*. We ſee alſo, that *Cock-Birds*, amongſt *Singing-Birds*, are ever the better *Singers*; which may be, becauſe they are more lively, and liſten more.

240 *Labour*, and *Intention* to *imitate Voyces*, doth conduce much to *Imitation*: And therefore we ſee, that there be certaine *Pantomimi*, that will repreſent the voyces of *Players* of *Enterludes*, ſo to life, as if you ſee them not, you would think they were thoſe *Players* themſelves; And ſo the *Voyces* of other *Men* that they heare.

241 There have beene ſome, that could counterfeit the *Diſtance* of *Voices*, (which is a *Secondary Object* of *Hearing*,) in ſuch ſort; As when they ſtand faſt by you, you would think the *Speech* came from a farre off, in a fearfull manner. How this is done, may be further enquired. But I ſee no great uſe of it, but for Impoſture, in counterfeiting Ghoſts or Spirits.

Experiments in Conſort, touching the *Reflexion* of *Sounds*.

There be three Kindes of *Reflexions* of *Sounds*; A *Reflexion Concurrent*; A *Reflexion Iterant*, which we call *Eccho*; And a *Super-reflexion*, or an *Eccho* of an *Eccho*, whereof the firſt hath beene handled in the *Title* of *Magnitude* of *Sounds*: The Latter two we will now ſpeak of.

242 The *Reflexion* of *Species Viſible*, by *Mirrours*, you may command; Becauſe paſſing in Right Lines, they may be guided to any point: But the *Reflexion* of *Sounds* is hard to maſter; Becauſe the *Sound* filling great Spaces in Arched Lines, cannot be ſo guided: And therefore we ſee there hath not beene practiſed, any Meanes to make *Artificiall Eccho's*. And no *Eccho* already knowne returneth in a very narrow Roome.

243 The *Naturall Eccho's* are made upon *Walls*, *Woods*, *Rocks*, *Hills*, and *Banckes*; As for *Waters*, being neare, they make a *Concurrent Eccho*; but being further off, (as upon a large *River*) they make an *Iterant Eccho*: For there is no difference between the *Concurrent Eccho*, and the *Iterant*, but the Quickneſſe, or Slowneſſe of the Returne. But there is no doubt, but *Water* doth helpe the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

244 It is certaine, (as hath beene formerly touched,) that if you ſpeake thorow a *Trunke*, ſtopped at the further end, you ſhall finde a Blaſt returne upon your Mouth, but no *Sound* at all. The *Cauſe* is, for that the *Cloſeneſſe*, which preſerveth the *Originall*, is not able to preſerve the *Reflected Sound*: Beſides that *Eccho's* are ſeldome created, but by loud *Sounds*. And therefore there is leſſe hope of *Artificiall Eccho's* in Aire, pent in a narrow Concave. Nevertheleſſe it hath bin tried, that One leaning over a *Well*, of 25. Fathome deep, and ſpeaking, though but ſoftly, (yet not ſo ſoft as a whiſper,) the *Water* returned a good *Audible Eccho*. It would be tried, whether Speaking in *Caves*, where there is no Iſſue, ſave where you ſpeak, will not yeeld *Eccho's*, as *Wells* doe.

245 The *Eccho* commeth as the *Originall Sound doth*, in a round Orbe of Aire: It were good to try the Creating of the *Eccho*, where the Body Repercuſſing maketh an Angle: As againſt the Returne of a Wall, &c. Alſo we ſee that in *Mirrours*, there is the like Angle of Incidence, from the Object to the Glaſſe, and from the Glaſſe to the Eye. And if you ſtrike a *Ball* ſide-long, not full upon the Surface, the Rebound will be as much the contrary way; Whether

ther there be any such *Reſilience* in *Eccho's*, (that is, whether a Man ſhall heare better, if he ſtand aſide the Body Repercuſſing, than if he ſtand where he ſpeaketh, or any where in a right Line betweene;) may be tried. Triall likewiſe would be made, by Standing nearer the place of Repercuſſing, than he that ſpeaketh; And againe by Standing further off, than he that ſpeaketh; And ſo knowledge would be taken, whether *Eccho's*, as well as *Originall Sounds*, be not ſtrongeſt neare hand.

There be many Places, where you ſhall heare a number of *Eccho's* one after another: And it is, when there is Variety of *Hills* or *Woods*, ſome nearer, ſome further off: So that the Returne from the further, being laſt created, will be likewiſe laſt heard. 246

As the *Voice* goeth round, as well towards the Back, as towards the Front of him that ſpeaketh; So likewiſe doth the *Eccho*; For you have many Back-*Eccho's* to the Place where you ſtand. 247

To make an *Eccho*, that will report, three, or foure, or five Words, diſtinctly, it is requiſite, that the *Body Repercuſſing*, be a good diſtance off: For if it be neare, and yet not ſo neare, as to make a *Concurrent Eccho*, it choppeth with you upon the ſudden. It is requiſite likewiſe, that the *Aire* bee not much *pent*. For *Aire*, at a great diſtance, *pent*, worketh the ſame effect with *Aire*, at *large*, in a ſmall diſtance. And therefore in the *Triall* of *Speaking* in the *Well*, though the *Well* was deepe, the *Voice* came back, ſuddenly; And would beare the Report but of two Words. 248

For *Eccho's* upon *Eccho's*, there is a rare Inſtance thereof in a Place, which I will now exactly deſcribe. It is ſome three or foure Miles from *Paris*, neare a Towne called *Pont-Charenton*; And ſome Bird-bolt ſhot, or more, from the River of *Seane*. The Roome is a *Chappell*, or ſmall *Church*. The Walls all ſtanding, both at the Sides, and at the Ends. Two Rowes of Pillars, after the manner of Iſles of *Churches*, alſo ſtanding; The Roofe all open, not ſo much as any Embowment neere any of the walls left. There was againſt every Pillar, a Stack of Billets, above a Mans Height; which the Watermen, that bring Wood downe the *Seane*, in Stacks, and not in Boats, laid there (as it ſeemeth) for their eaſe. Speaking at the one End, I did heare it returne the Voice thirteene ſeverall times; And I have heard of others, that it would returne ſixteene times: For I was there about three of the Clock in the afternoone: And it is beſt, (as all other *Eccho's* are) in the Evening. It is manifeſt, that it is not *Eccho's* from ſeverall places, but a *Toſſing* of the *Voyce*, as a Ball, to and fro; Like to *Reflexions* in *Looking-glaſſes*; where if you place one *Glaſſe* before, and another behinde, you ſhall ſee the *Glaſſe* behinde with the *Image*, within the *Glaſſe* before; And againe, the *Glaſſe* before in that; and divers ſuch *Super-Reflexions*, till the *ſpecies ſpeciei* at laſt die. For it is every Returne weaker, and more ſhady. In like manner, the *Voice* in that *Chappell*, createth *ſpeciem ſpeciei*, and maketh ſucceeding *Super-Reflexions*; For it melteth by degrees, and every *Reflexion* is weaker than the former: So that, if you ſpeake three Words, it will (perhaps) ſome three times report you the whole three Words; And then the two latter Words for ſome times; And then the laſt Word alone for ſometimes; Still fading, and growing weaker. And whereas in *Eccho's* of one Returne, it is much to heare foure or five Words; In this *Eccho* of ſo many Returnes, upon the matter, you heare above twenty Words for three. 249

The like *Eccho* upon *Eccho*, but only with two Reports, hath beene obſerved to be, if you ſtand betweene a *Houſe*, and a *Hill*, and lure towards the 250

Hill

Hill. For the *Houſe* will give a *Back-Eccho*; One taking it from the other, and the latter the weaker.

251 There are certaine *Letters*, that an *Eccho* will hardly expreſſe; As *S*, for one; Eſpecially being Principall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Pariſian*, that took it to be the Work of Spirits, and of good Spirits. For, (ſaid he) call *Satan*, and the *Eccho* will not deliver backe the Devils name; But will ſay, *Va'en*; Which is as much in *French*, as *Apage*, or *Avoid*. And thereby I did hap to finde, that an *Eccho* would not returne *S*, being but a Hiſſing and an *Interiour Sound*.

252 *Eccho's* are ſome more ſudden, and chop againe, as ſoone as the *Voice* is delivered; As hath beene partly ſaid: Others are more deliberate, that is, give more Space betweene the *Voice*, and the *Eccho*; which is cauſed by the locall Nearneſſe, or Diſtance: Some will report a longer Traine of Words; And ſome a ſhorter: Some more loud (full as loud as the *Originall*, and ſometimes more loud;) And ſome weaker and fainter.

253 Where *Eccho's* come from ſeverall Parts, at the ſame diſtance, they muſt needs make (as it were) a Quire of *Eccho's*, and ſo make the Report greater, and even a *Continued Eccho*; which you ſhall find in ſome *Hills*, that ſtand encompaſſed, Theatre-like.

254 It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Viſible*. For I doe not thinke, that if a *Sound* ſhould paſſe through divers *Mediums*, (as *Aire*, *Cloth*, *Wood*) it would deliver the *Sound*, in a differing Place, from that unto which it is deferred; which is the Proper Effect of *Refraction*. But *Majoration* which is alſo the Worke of *Refraction*, appeareth plainly in *Sounds*, (as hath beene handled at full;) But it is not by Diverſitie of *Mediums*.

Experiments in Conſort, touching the *Conſent* and *Diſſent* betweene *Viſibles* and *Audibles*.

Wee haue *obiter*, for Demonſtrations ſake, uſed in divers *Inſtances*, the *Examples* of the *Sight*, and *Things Viſible*, to illuſtrate the *Nature* of *Sounds*. But we thinke good now to proſecute that *Compariſon* more fully.

CONSENT OF VISIBLES and Audibles.

255 *Both* of them *ſpread themſelves in Round*, and fill a whole Floare or Orbe, unto certaine Limits: And are carried a great way: And do languiſh and leſſen by degrees, according to the Diſtance of the objects from the Senſories.

256 *Both* of them have the whole *Species in every ſmall portion of the Aire* or *Medium*, So as the *Species* doe paſſe through ſmall Cranies, without Confuſion: As we ſee ordinarily in *Levels*, as to the *Eye*; And in *Crannies*, or *Chinks*, as to the *Sound*.

257 *Both* of them are of a *ſudden and eaſie Generation* and *Delation*; And likewiſe *periſh ſwiftly*, and *ſuddenly*; As if you remove the *Light*; Or touch the *Bodies* that give the *Sound*.

Both

258 *Both* of them doe *receive* and *carry exquisite* and *accurate Differences*; As of Colours, Figures, Motions, Distances, in *Visibles*; And of Articulate Voices, Tones, Songs, and Quaverings, in *Audibles*.

259 *Both* of them in their Vertue and Working, do not appeare to *emit any Corporall Substance* into their *Mediums*, or the Orbe of their Vertue; Neither again to rise or stirre any *evident locall Motion* in their *Mediums*, as they passe; But only to carry certaine *Spirituall Species*; The perfect knowledge of the Cause whereof, being hitherto scarcely attained, we shall search and handle in due place.

260 *Both* of them seeme not to *generate* or *produce* any other *Effect in Nature*, but such as appertaineth to their proper Objects, and Senses, and are otherwise Barren.

261 But *Both* of them in their owne proper Action, doe worke three manifest *Effects*. The First, in that the *Stronger Species drowneth the Lesser*; As the Light of the Sun, the light of a Glow-worme; The Report of an Ordnance, the Voice: The Second, in that an *Object of Surcharge or Excesse destroyeth the Sense*; As the Light of the Sunne the Eye, a violent *Sound* (neare the Eare) the Hearing: The Third, in that *both of them will be reverberate*; As in *Mirrours*; And in *Eccho's*.

262 *Neither* of them doth *destroy or hinder the Species of the other*, although they *encounter* in the same *Medium*; As Light or Colour hinder not *Sound*; Nor *è contrà*.

263 *Both* of them *affect the Sense in Living Creatures*, and yeeld *Objects of Pleasure and Dislike*: Yet nevertheless, the *Objects* of them doe also (if it be well observed) affect and worke upon dead Things; Namely such, as have some Conformity with the *Organs* of the two *Senses*; As *Visibles* worke upon a *Looking-glasse*, which is like the Pupill of the Eye; And *Audibles* upon the Places of *Eccho*, which resemble, in some sort, the Caverne and structure of the Eare.

264 *Both* of them do *diversly work, as they have their Medium diversly disposed*. So a Trembling *Medium* (as Smoake) maketh the Object seeme to tremble; and a Rising or Falling *Medium* (as Winds) maketh the *Sounds* to rise, or fall.

265 To *Both*, the *Medium*, which is the most Propitious and Conducible, is *Aire*; For Glasse or Water, &c. are not comparable.

266 In *Both* of them, where the *object is Fine and Accurate*, it conduceth much to haue the *Sense Intentive, and Erect*; In so much as you contract your *Eye*, when you would see sharply; And erect your *Eare*, when you would heare attentively; which in Beasts that haue Eares moveable, is most manifest.

267 The *Beames* of *Light*, when they are *multiplied*, and *conglomerate*, generate *Heat*; which is a different Action, from the Action of *Sight*: And the *Multiplication* and *Conglomeration* of *Sounds* doth generate an extreme *Rarefaction* of the *Aire*; which is an Action materiate, differing from the Action of *Sound*; If it bee true (which is anciently reported) that *Birds*, with great shouts, have fallen downe.

DIS-

DISSENTS OF VISIBLES and Audibles.

268 THe *Species* of *Visibles* seeme to be *Emissions* of *Beames* from the *Object seen*; Almost like Odours, save that they are more Incorporeall: But the *Species* of *Audibles* seeme to Participate more with *Locall Motion*, like *percussions*, or *Impressions* made upon the *Aire*. So that whereas all Bodies doe seeme to worke in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.

269 The *Species* of *Audibles* seeme to be carried more manifestly thorow the *Aire*, than the *Species* of *Visibles*: For (I conceive) that a Contrary strong Wind will not much hinder the Sight of *Visibles*, as it will doe the Hearing of *Sounds*.

270 There is one *Difference*, above all others, betweene *Visibles* and *Audibles*, that is the most remarkable; as that whereupon many smaller Differences doe depend: Namely, that *Visibles*, (except *Lights*,) are *carried in Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the Solidity of Bodies doth not much hinder the Sight, so that the Bodies be cleare, and the Pores in a Right Line, as in Glasse, Chrystall, Diamonds, Water, &c. But a thin Scarfe, or Handkerchiefe, though they be Bodies nothing so solid, hinder the Sight: Whereas (contrariwise) these Porous Bodies doe not much hinder the Hearing, but solid Bodies doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small Glasses suffice; but to the *Reverberation* of *Audibles*, are required greater Spaces, as hath likewise beene said before.

271 *Visibles* are seene further off, than *Sounds* are heard; Allowing nevertheless the *Rate* of their *Bignesse*: For otherwise a *great Sound* will be heard further off, than a *Small Body* seene.

272 *Visibles* require (generally) some *Distance* betweene the *Object*, and the *Eye*, to bee better seene; Whereas in *Audibles*, the nearer the Approch of the *Sound* is to the Sense, the better. But in this there may be a double Error. The one becaus to *Seeing*, there is required *Light*; And any thing that toucheth the Pupill of the Eye (all over,) excludeth the *Light*. For I have heard of a Person very credible, (who himselfe was cured of a Cataract in one of his Eyes,) that while the Silver Needle did worke upon the Sight of his Eye, to remove the Filme of the Cataract, he never saw any thing more cleare or perfect, than that white Needle: Which (no doubt,) was, because the Needle was lesser than the *Pupill* of the *Eye*, and so tooke not the Light from it. The other Errour may be, for that the *Object* of *Sight* doth strike upon the *pupill* of the *Eye*, directly without any interception; whereas the *Cave* of the *Eare* doth hold off the *Sound* a little from the Organ: And so nevertheless there is some *Distance* required in both.

273 *Visibles* are swiftlier carried to the *Sense*, than *Audibles*; As appeareth in Thunder

Thunder and Lightning; Flame and Report of a Peece; Motion of the Aire in Hewing of Wood. All which have beene set downe heretofore, but are proper for this *Title*.

I conceive also, that the *Species* of *Audibles*, doe hang longer in the Aire than those of *Visibles*: For although even those of *Visibles*, doe hang some ime, as we see in *Rings turned*, that shew like Spheres; In *Lute-strings* fillipped; A *Fire-brand* carried along, which leaveth a Traine of Light behinde it; and in the *Twilight*; And the like: Yet I conceive that *Sounds* stay longer, because they are carried up and downe with the Winde: And because of the Distance of the Time, in *Ordnance discharged*, and *heard* twenty Miles off. 274

In *Visibles*, there are not found Objects so odious and ingrate to the *Sense*, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate Objects. And therefore in *Pictures*, those foule Sights doe not much offend; But in *Audibles*, the Grating of a Saw, when it is sharpned, doth offend so much, as it setteth the Teeth on Edge. And any of the *harsh Discords* in *Musicke*, the Eare doth straight-wayes refuse. 275

In *Visibles*, after great Light, if you come suddenly into the *Darke*; Or contrariwise, out of the *Darke* into a *Glaring light*, The Eye is dazled for a time, and the *Sight* confused; But whether any such Effect be after great *Sounds*, or after *a deepe Silence*, may be better enquired. It is an old Tradition, that those that dwell neare the *Catarracts* of *Nilus*, are strucken deafe: But we finde no such effect, in Cannoniers, nor Millers, nor those that dwell upon Bridges. 276

It seemeth that the *Impression* of *Colour* is so weak, as it worketh not but by a Cone of Direct *Beames*, or Right Lines; whereof the Basis is in the Object, and the Verticall Point in the Eye; So as there is a Corradiation and Conjunction of *Beames*; And those *Beames* so sent forth, yet are not of any force to beget the like borrowed or second *Beames*, except it be by *Reflexion*, whereof we speak not. For the *Beames* passe, and give little Tincture to that Aire, which is Adjacent; which if they did, we should see *Colours* out of a Right line. But as this is in *Colours*, so otherwise it is in the *Body* of *Light*. For when there is a Skreene between the Candle and the Eye, yet the *Light* passeth to the Paper whereon One writeth; So that the *Light* is seene, where the Body of the *Flame* is not seene; And where any *Colour* (if it were placed where the Body of the *Flame* is) would not be seene. I judge that *Sound* is of this Latter Nature: For when two are placed on both sides of a Wall, and the Voice is heard, I judge it is not onely the *Originall Sound*, which passeth in an *Arched Line*; But the *Sound*, which passeth above the Wall in a Right Line, begetteth the like Motion round about it, as the first did; though more weake. 277

Experiments in Consort touching the *Sympathy* or *Antipathy* of *Sounds*, one with another.

ALL *Concords* and *Discords* of *Musicke*, are (no doubt) *Sympathies* and *Antipathies* of *Sounds*. And so (likewise) in that *Musicke*, which we call *Broken Musicke*, or *Consort Musicke*; Some *Consorts* of *Instruments* are sweeter than others; (A Thing not sufficiently yet observed:) As the *Irish Harpe*, and *Base Viall* agree well: The *Recorder* and *Stringed Musicke* agree well: *Organs* and the *Voice* agree well; &c. But the *Virginalls* and the *Lute*; Or the *Welch-Harpe*, and *Irish-Harpe*; Or the *Voice* and *Pipes* alone, agree not so well; But for the *Melioration* of *Musick*, there is yet much left (in this Point of *Exquisite Consorts*) to trie and enquire. 278

279 There is a Common Obſervation, that if a *Lute*, or *Viall*, be layed upon the Backe, with a ſmall Straw upon one of the *Strings*; And another *Lute* or *Viall* be laid by it; And in the other *Lute*, or *Viall*, the *Vniſon* to that *String* be ſtrucken; it will make the *String* move; Which will appeare both to the Eye, and by the *Strawes* Falling off. The like will be, if the *Diapaſon* or *Eight* to that *String* be ſtrucken, either in the ſame *Lute*, or *Viall*, or in others lying by; But in none of theſe there is any Report of *Sound*, that can be diſcerned, but onely Motion.

280 It was devi'ed, that a *Viall* ſhould haue a Lay of Wire Strings below, as cloſe to the Belly as a *Lute*; And then the *Strings* of Guts mounted upon a Bridge, as in Ordinary *Vialls*; To the end, that by this means, the upper *Strings* ſtrucken, ſhould make the lower reſound by *Sympathy*, and ſo make the *Muſicke* the better; Which, if it be to purpoſe, then *Sympathy* worketh, as well by Report of *Sound*, as by *Motion*. But this device I conceive to be of no uſe, becauſe the upper *Strings*, which are ſtopped in great variety, cannot maintaine a *Diapaſon* or *Vniſon*, with the Lower, which are never ſtopped. But if it ſhould be of uſe at all; it muſt be in *Inſtruments* which haue no Stops; as *Virginalls*, and *Harpes*; wherein triall may be made of two Rowes of Strings, diſtant the one from the other.

281 The *Experiment* of *Sympathy* may be transferred (perhaps) from *Inſtruments* of *Strings*, to other *Inſtruments* of *Sound*. As to try if there were in one Steeple, two *Bells* of *Vniſon*, whether the ſtriking of the one would move the other, more then if it were another Accord: And ſo in *Pipes*, (if they be of equall Bore, and *Sound*,) whether a little Straw or Feather would move in the one *Pipe*, when the other is blowne at an *Vniſon*.

282 It ſeemeth both in *Eare*, and *Eye*, the *Inſtrument* of *Senſe* hath a *Sympathy* or Similitude with that which giveth the *Reflexion*; (As hath beene touched before.) For as the *Sight* of the *Eye* is like a Cryſtall, or Glaſſe, or Water; So is the *Eare* a ſinuous Cave, with a hard Bone, to ſtop and reverberate the *Sound*: Which is like to the Places that report *Eccho's*.

Experiments in Conſort touching the *Hindring* or *Helping* of the *Hearing*.

283 WHen a Man *Yawneth*; he cannot *Heare* ſo well. The *Cauſe* is, for that the *Membrane* of the *Eare* is extended; And ſo rather caſteth off the *Sound*, than draweth it to.

284 We *Heare* better when we *hold our Breath*, than contrary; In ſo much as in all Liſtening to attaine a *Sound* a farre off, Men *hold their Breath*. The *Cauſe* is, For that in all *Expiration*, the Motion is Outwards; And therefore, rather driveth away the voice, than draweth it: And beſides we ſee, that in all *Labour* to doe things with any ſtrength, wee *hold the Breath*: And liſtening after any *Sound*, that is heard with difficultie, is a kind of *Labour*.

285 Let it be tryed, for the *Helpe* of the *Hearing*, (and I conceive it likely to ſucceede,) to make an *Inſtrument* like a *Tunnell*; The narrow Part whereof may be of the Bigneſſe of the Hole of the *Eare*; And the Broader End much larger, like a *Bell* at the Skirts; And the length half a foot, or more. And let the narrow End of it be ſet cloſe to the *Eare*: And marke whether any *Sound*, abroad in the open Aire, will not be heard diſtinctly, from further diſtance, than without that Inſtrument; being (as it were) an *Eare-Spectacle*. And I haue heard there is in *Spaine*, an *Inſtrument* in uſe to be ſet to the *Eare*, that *helpeth* ſomewhat thoſe that are Thicke of Hearing.

286 If the *Mouth* be ſhut Cloſe, neverthelеſſe there is yeelded by the Roof of the mouth, a Murmur. Such as is uſed by dumbe Men: But if the *Noſtrills* be likewiſe ſtopped, no ſuch Murmur can be made; Except it be in the Bottome

tome of the Pallate towards the Throat. Whereby it appeareth manifestly, that a *Sound* in the *Mouth*, except such as aforesaid, if the *Mouth* bestopped, passeth from the *Pallate* through the *Nostrils*.

Experiments in Consort touching the *Spirituall* and *Fine Nature* of *Sounds*.

287 THe *Repercussion* of *Sounds*, (which we call *Eccho*,) is a great Argument of the *Spirituall Essence* of *Sounds*. For if it were *Corporeall*, the Repercussion should be created in the same manner, and by like *Instruments*, with the *Originall Sound*: But we see what a Number of *Exquisite Instruments* must concurre in Speaking of Words, whereof there is no such Matter in the *Returning* of them; But onely a plain Stop, and *Repercussion*.

288 The Exquisite *Differences* of *Articulate Sounds*, carried along in the *Aire*, shew that they cannot be *Signatures* or *Impressions* in the *Aire*, as hath beene well refuted by the Ancients. For it is true, that Seales make excellent Impressions: And so it may be thought of *Sounds* in their first Generation: But then the *Delation* and *Continuance* of them without any new Sealing, shew apparently they cannot be Impressions.

289 All *Sounds* are suddenly made, and doe suddenly perish; But neither that, nor the *Exquisite Differences* of them, is Matter of so great Admiration: For the Quaverings, and Warblings in Lutes, and Pipes, are as swift; And the Tongue, (which is no very fine Instrument,) doth in Speech, make no fewer Motions, than there be Letters in all the Words, which are uttered. But that *Sounds* should not onely be so speedily generated, but carried so farre every way, in such a momentany time, deserveth more Admiration. As for Example; If a Man stand in the Middle of a Field, and speak aloud, he shall be heard a Furlong in round; And that shall be in *Articulate Sounds*; And those shall be Entire in every little Portion of the Aire; And this shall be done in the Space of lesse than a Minute.

290 The *Sudden Generation* and *Perishing* of *Sounds*, must be one of these two Wayes. Either that the *Aire* suffereth some Force by *Sound*, and then restoreth it selfe; As Water doth; Which being divided, maketh many Circles, till it restore it selfe to the naturall Consistence: Or otherwise, that the *Aire* doth willingly imbibe the *Sound* as gratefull, but cannot maintain it; for that the *Aire* hath (as it should seeme) a secret and hidden Appetite of Receiving the *Sound* at the first; But then other Grosse and more Materiate Qualities of the Aire straight-wayes suffocate it; Like unto *Flame*, which is generated with Alacrity, but straight quenched by the Enmity of the *Aire*, or other Ambient Bodies.

There be these *Differences* (in generall) by which *Sounds* are divided; 1. *Musicall*, *Immusicall*; 2. *Treble*, *Base*; 3. *Flat*, *Sharpe*; 4. *Soft*, *Loud*; 5. *Exteriour*, *Interiour*; 6. *Cleane*, *Harsh* or *Purling*; 7. *Articulate*, *Inarticulate*.

We have laboured (as may appear) in this *Inquisition* of *Sounds*, diligently; Both because *Sound* is one of the most Hidden Portions of *Nature*, (as we said in the beginning:) And because it is a *Vertue* which may be called *Incorporeal*, and *Immateriate*; whereof there be in *Nature* but few. Besides, we were willing, (now in these our first *Centuries*,) to make a Patterne or President of an

Exact Inquisition; And wee shall doe the like hereafter in some other Subjects which require it. For we desire that Men should learne and perceive, how severe a Thing the true *Inquisition* of *Nature* is; And should accustome themselves, by the light of Particulars, to inlarge their Mindes, to the Amplitude of the World; and not reduce the World to the Narrownesse of their Mindes.

Experiment Solitary touching the *Orient Colours*, in *Dissolution* of *Metalls*. 291

Metalls give *Orient* and *Fine Colours* in *Dissolutions*; As *Gold* giveth an excellent Yellow; *Quick-Silver* an excellent Greene; *Tinne* giveth an excellent Azure: Likewise in their *Putrefactions*, or *Rusts*; As *Vermilion*, *Verdegrease*, *Bise*, *Cirrus*, &c. And likewise in their *Vitrifications*. The *Cause* is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Posture; And againe to retain Part of their principall Spirit; Which two Things, (Equall Posture, and Quick Spirits) are required chiefly, to make *Colours* lightsome.

Experiment Solitary touching *Prolongation* of *Life*. 292

It conduceth unto *Long Life*, and to the more Placide Motion of the Spirits, which thereby do lesse prey and consume the Juyce of the Body; Either that *Mens Actions be free and voluntary*; that nothing be done *Invitâ Minervâ*, but *Secundum genium*: Or on the other side, that the *Actions* of *Men be full of Regulation, and Commands within themselves*: For then the Victory and Performing of the Command, giveth a good Disposition to the Spirits; Especially if there be a Proceeding from Degree to Degree; For then the Sense of Victory is the greater. An example of the former of these, is in a Countrey life; And of the latter, in *Monkes* and *Philosophers*, and such as do continually enjoyne themselves.

Experiment Solitary touching *Appetite* of *Vnion* in *Bodies*. 293

It is certaine, that in all Bodies, there is an *appetite* of *Vnion*, and Evitation of Solution of Continuity: And of this *Appetite* there be many *Degrees*; But the most Remarkable, and fit to be distinguished, are three. The first in *Liquours*; The second in *Hard Bodies*: And the third in *Bodies Cleaving* or *Tenacious*. In *Liquours*, this *Appetite* is weake: We see in *Liquours*, the *Thredding* of them in *Stillicides*, (as hath been said;) The *Falling* of them in *Round Drops*, (which is the forme of *Vnion*;) And the *Staying* of them, for a little time, in *Bubbles and Froth*. In the second *Degree* or *Kinde*, this *Appetite* is strong; As in *Iron*, in *Stone*, in *Wood*, &c. In the third, this *Appetite* is in a *Medium* betweene the other two: For such *Bodies* doe partly follow the Touch of another Body; And partly sticke and continue to themselves; And therefore they roape, and draw themselves in Threds; As wee see in *Pitch*, *Glew*, *Birdlime*, &c. But note, that all *Solide Bodies* are *Cleaving*, more or lesse: and that they love better the Touch of somewhat that is *Tangible*, than of *Aire*. For *Water*, in small quantitie, cleaveth to any Thing that is Solide; And so would *Metall* too, if the weight drew it not off. And therefore *Gold Foliate*, or any *Metall Foliate*, cleaveth: But those *Bodies* which are noted to be Clammy, and Cleaving, are such, as have a more indifferent *Appetite* (at once,) to follow another *Body*; And to hold to themselves. And therefore they are commonly *Bodies* ill mixed; And which take more pleasure in a Forrain Body, than in preserving their own *Consistence*; And which have little predominance in *Drought* or *Moisture*.

Time, and *Heat*, are Fellows in many Effects. *Heat* drieth Bodies, that do easily expire; As Parchment, Leaves, Roots, Clay, &c. And, so doth *Time* or *Age* arefie; As in the same Bodies, &c. *Heat* dissolveth and melteth Bodies, that keep in their Spirits; As in divers *Liquefactions*; And so doth *Time*, in some Bodies of a softer Consistence: As is manifest in Honey, which by *Age* waxeth more liquid; And the like in Sugar; And so in old Oyle, which is ever more cleare, and more hot in Medicinable use. *Heat* causeth the Spirits to search some Issue out of the Body; As in the *Volatility* of *Metals*; And so doth *Time*; As in the *Rust* of *Mettalls*. But genetally *Heat* doth that in small time, which *Age* doth in long.

Experiment Solitary touching the *like Operations* of *Heat*, and *Time* 294

Some Things which passe the *Fire* are softest at first, and by *Time* grow hard; As the Crumme of Bread. Some are harder when they come from the *Fire*, and afterwards give againe, and grow soft, as the Crust of Bread, Bisket, Sweet Meats, Salt, &c. The *Cause* is, for that in those things which waxe Hard with *Time*, the Work of the *Fire* is a Kinde of *Melting*: And in those that waxe Soft with *Time*, (contrariwise,) the work of the *Fire* is a Kinde of *Baking*; And whatsoever the *Fire* baketh, *Time* doth in some degree dissolve.

Experiment Solitary touching the *differing Operations* of *Fire*, and *Time*. 295

Motions passe from one Man to another, not so much by Exciting Imagination; as by Invitation; Especially if there be an Aptnesse or Inclination before. Therefore *Gaping*, or *Yawning*, and *Stretching* doe passe from Man to Man; For that that causeth *Gaping* and *Stretching* is, when the Spirits are a little Heavy, by any Vapour, or the like. For then they strive (as it were,) to wring out, and expell that which loadeth them. So Men drowzy, and desirous to sleep; Or before the Fit of an Ague; doe use to Yawne and Stretch; And doe likewise yeeld a *Voyce* or *Sound*, which is an *Interjection* of *Expulsion*: So that if another be apt and prepared to doe the like, he followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

Experiment Solitary, touching *Motions* by *Imitation*. 296

There be some knowne *Diseases* that are *Infectious*; And Others that are not. Those that are *Infectious*, are; First, such as are chiefly in the *Spirits*, and not so much in the *Humours*; And therefore passe easily from Body to Body: Such are *Pestilences*, *Lippitudes*, and such like. Secondly, such as *Taint* the *Breath*; Which we see passeth manifestly from Man to Man; And not invisible, as the *Affects* of the *Spirits* doe: Such are *Consumptions* of the *Lungs*, &c. Thirdly, such as come forth to the *Skinne*; And therefore taint the *Aire*, or the *Body Adjacent*; Especially if they consist in an Unctuous Substance, not apt to dissipate; Such are *Scabs*, & *Leprosie*. Fourthly, such as are meerly in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they never infect, but by *Touch* onely; And such a *Touch*, also as commeth within the *Epidermis*; As the venome of the *French Poxe*; And the *Biting* of a *Mad Dog*.

Experiment Solitary touching *Infectious Diseases*. 297

Most *Powders* grow more Close and Coherent by *Mixture* of *Water* than by *Mixture* of *Oyle*, though *Oyle* be the thicker Body; As *Meale*, &c. The Reason is the Congruitie of Bodies; which if it be more, maketh a Perfecter Imbibition, and Incorporation; Which in most *Powders* is more between *Them* and *Water*, then between *Them* and *Oyle*: But *Painters Colours* ground, and *Ashes*, doe better incorporate with *Oyle*.

Experiment Solitary touching the *Incorporation* of *Powders*, and *Liquours*. 298

Experiment Solitary touching *Exercise* of the *Body*. 299

MUch *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for others. If the Body be Hot, and Void of Superfluous Moistures, too much *Motion* hurteth: And it is an Errour in *Physitians*, to call too much upon *Exercise*. Likewise men ought to beware, that they use not *Exercise*, and a *Spare Diet* both: But if much *Exercise*, then a *Plentifull Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise* are, First, that it sendeth *Nourishment* into the Parts more forcibly. Secondly, that it helpeth to Excerne by *Sweat*, and so maketh the Parts assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solide* and *Compact*; And so lesse apt to be Consumed and Depredated by the *Spirits*. The *Evills* that come of *Exercise*, are: First, that it maketh the *Spirits* more Hot and Predatory. Secondly, that it doth absorbe likewise, and attenuate too much the Moisture of the *Body*. Thirdly, that it maketh too great *Concussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in Rest. But generally *Exercise*, if it bee much, is no Friend to *Prolongation* of *Life*; Which is one Cause, why *Women* live longer then *Men*, because they stirre lesse.

Experiment Solitary, touching *Meats* that *induce Satiety*. 300

SOme *Food* wee may use *long*, and *much*, without *Glutting*; As Bread, Flesh that is not fat, or ranck, &c. Some other, (though pleasant,) *Glutteth* sooner; As Sweet Meats, Fat Meats, &c. The *Cause* is, for that *Appetite* consisteth in the Emptinesse of the Mouth of the Stomack; Or possessing it with somewhat that is Astringent; And therefore Cold and Drie. But things that are *Sweet* and *Fat*, are more Filling: And do swimme and hang more about the Mouth of the Stomacke; And go not down so speedily: And again turn sooner to *Choler*, which is hot, and ever abateth the Appetite. We see also, that another *Cause* of *Satiety*, is an *Over-Custome*; and of *Appetite* is *Novelty*: And therefore *Meats*, if the same be continually taken, induce *Loathing*. To give the Reason of the *Distaste* of *Satiety*, and of the *Pleasure* in *Novelty*; and to distinguish not onely in Meats and Drinkes, but also in Motions, Loves, Company, delights, Studies, what they be that *Custome* maketh more gratefull; And what more tedious; were a large Field. But for *Meats*, the Cause is *Attraction*, which is quicker, and more excited towards that which is new, than towards that whereof there remaineth a Relish by former use. And (generally) it is a Rule, that whatsoever is somewhat Ingrate at first, is made Gratefull by *Custome*; But whatsoever is too Pleasing at first, groweth quickly to *satiate*.

NATU-

NATVRALL HISTORIE.

IV. Century.

ACCELERATION of *Time*, in *Works* of *Nature*, may well be esteemed *Inter Magnalia Naturæ*. And even in *Divine Miracles*, *Accelerating* of the *Time*, is next to the *Creating* of the *Matter*. We will now therefore proceed to the Enquiry of it: And for *Acceleration* of *Germination*, we will referre it over unto the place, where we shall handle the Subject of *Plants*, generally; And will now begin with other *Accelerations*.

Experiments in Consort, touching the *Clarification* of *Liquours*, and the *Accelerating* thereof.

301 *Liquours* are (many of them,) at the first, thicke and troubled; As *Must*, *Wort*, *Iuyces* of *Fruits*, or *Hearbs* expressed, &c. And by *Time* they settle, and Clarifie. But to make them cleare, before the *Time*, is a great Work; For it is a Spurre to Nature, and putteth her out of her pace: And besides, it is of good use, for making *Drinkes*, and *Sauces*, Potable, and Serviceable, speedily; But to know the *Meanes* of *Accelerating Clarification*, we must first know the *Causes* of *Clarification*. The first *Cause* is, by the *Separation* of the *Grosser Parts* of the *Liquour*, from the *Finer*. The second, by the *Equall Distribution* of the *Spirits* of the *Liquour*, with the *Tangible Parts*: For that ever representeth Bodies Cleare and Untroubled. The third, by the *Refining* the *Spirit it Selfe*, which thereby giveth to the *Liquour* more Splendour, and more Lustre.

302 First, for *Separation*; It is wrought by *Weight*; As in the ordinary Residence or Settlement of *Liquours*: By *Heat*: By *Motion*: By *Precipitation*, or *Sublimation*; (That is, a Calling of the severall Parts, either up, or downe, which is a kinde of *Attraction*:) By *Adhesion*; As when a Body more *Viscous* is mingled and agitated with the *Liquour*; which Viscous Body (afterwards severed) draweth with it the grosser Parts of the *Liquour*: And Lastly, By *Percolation* or *Passage*. Secondly,

303 Secondly, for the *Even Distribution* of the *Spirits*; It is wrought By *Gentle Heat*; And By *Agitation* or *Motion*; (For of *Time* we speak not, because it is that, we would anticipate and represent:) And it is wrought also, By *Mixture* of some other *Body*, which hath a vertue to open the *Liquour*, and to make the *Spirits* the better passe thorow.

304 Thirdly, for the *Refining* of the *Spirit*, it is wrought likewise By *Heat*; By *Motion*; And By *Mixture* of some *Body* which hath *Vertue to attenuate*. So therefore (having shewen the *Causes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take these *Instances*, and *Trials*.

305 It is in common Practice, to draw *Wine*, or *Beere*, from the *Lees*, (which we call *Racking*;) whereby it will *Clarifie* much the sooner: For the *Lees*, though they keep the *Drink* in Heart, and make it lasting; yet withall they cast up some Spissitude: And this *Instance* is to be referred to *Separation*.

306 On the other side, it were good to trie, what the Adding to the *Liquour* more *Lees* than his owne will worke; For though the *Lees* doe make the *Liquour* turbide, yet they refine the *Spirits*. Take therefore a Vessell of *New Beere*; And take another Vessell of *New Beere*, and Rack the one Vessel from the *Lees*, and powre the *Lees* of the Racked Vessell into the unracked Vessell, and see the Effect: This *Instance* is referred to the *Refining* of the *Spirits*.

307 Take *New Beere*, and put in some Quantitie of *Stale Beere* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Grosser Parts, whereby they may fall down into *Lees*. And this *Instance* again is referred to *Separation*.

308 The longer *Mali*, or *Herbs*, or the like, are Infused in *Liquour*, the more thick and troubled the *Liquour* is; But the longer they be decocted in the *Liquour*, the clearer it is. The reason is plaine, because in *Infusion*, the longer it is, the greater is the Part of the Grosse Body, that goeth into the *Liquour*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or settleth at the Bottome. And therfore the most Exact Way to *Clarifie* is; First to *Infuse*, and then to take off the *Liquour*, and *Decoct* it; as they doe in *Beere*, which hath *Mali* first infused in the *Liquour*, and is afterwards boiled with the Hop. This also is referred to *Separation*.

309 Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almost to the very Neck: Let the Bottle be well stopped, lest it flie out: And continue it, renewing the *Embers* every day, by the space of Ten Dayes; and then compare it with another Bottle of the same *Beer* set by. Take also Lime both *Quenched*, and *Vnquenched*, and set the Bottles in them, *ut suprà*. This *Instance* is referred, both to the *Even Distribution*, and also to the *Refining* of the *Spirits* by *Heat*.

310 Take *Bottles*, and *Swing* them; Or *Carry* them in a *Wheele-Barrow*, upon *Rough Ground*; twice in a day: But then you may not fill the *Bottles* full, but leave some Aire; For if the *Liquour* come close to the Stopple, it cannot play, nor flower: And when you have shaken them well, either way, poure the *Drinke* into another Bottle, stopped close, after the usuall manner; For if it stay with much Aire in it, the *Drinke* will pall; neither will it settle so perfectly in all the Parts. Let it stand some 24 houres: Then take it, and put it again into a *Bottle* with *Aire*, *ut suprà*: And thence into a *Bottle Stopped ut suprà*: And so repeat the same *Operation* for seven dayes. Note that in the Emptying of one Bottle into another, you must doe it swiftly, lest the *Drinke* pall. It were good also, to trie it in a *Bottle* with a little Aire below the Neck, without Emptying. This *Instance* is referred to the *Even Distribution* and *Refining* of the *Spirits* by *Motion*.

As

As for *Percolation*, *Inward*, and *Outward*, (which belongeth to *Separation*,) Triall would be made, of *Clarifying* by *Adhesion*, with *Milke* put into *New-Beere*, and stirred with it: For it may be that the Grosser Part of the *Beere* will cleave to the *Milke*: The Doubt is, whether the *Milke* will sever well againe; Which is soone tried. And it is usuall in *Clarifying Ippocrasse* to put in *Milke*; Which after severeth and carrieth with it the *Grosser Parts* of the *Ippocrasse*, as hath beene said elsewhere. Also for the better *Clarification* by *Percolation*, when they tun *New Beere*, they use to let it passe through a *Strainer*; And it is like the finer the *Strainer* is, the clearer it will be. 311

Experiments in Consort touching *Maturation*, and the *Accelerating* thereof. And first touching the *Maturation* and *Quickening* of *Drinks*. And next touching the *Maturation* of *Fruits*.

The *Accelerating* of *Maturation* we will now enquire of. And of *Maturation* it selfe. It is of three Natures. The *Maturation* of *Fruits*: The *Maturation* of *Drinkes*: And the *Maturation* of *Impostumes*, and *Vlcers*. This last we referre to another Place, where we shall handle *Experiments Medicinall*. There be also other *Maturations*, as of *Metals*, &c. whereof we will speake as Occasion serveth. But we will begin with that of *Drinkes*, because it hath such Affinitie with the *Clarification* of *Liquours*.

For the *Maturation* of *Drinks*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digest more perfectly the Grosser Parts: And it is effected partly, by the same meanes, that *Clarification* is, (whereof we spake before;) But then note, that an Extreme *Clarification* doth spread the *Spirits* so Smooth, as they become Dull, and the *Drink* dead, which ought to have a little Flouring. And therefore all your Cleare *Amber Drinke* is flat. 312

Wee see the *Degrees* of *Maturation* of *Drinkes*; In *Must*; In *Wine*, as it is drunke; And in *Vinegar*. Whereof *Must* hath not the *Spirits* well Congregated; *Wine* hath them well united; so as they make the Parts somewhat more Oylie: *Vinegar* hath them Congregated, but more Jejune, and in smaller Quantity; The greatest and finest Spirit and Part being exhaled: For we see *Vinegar* is made by setting the Vessell of *Wine* against the hot Sunne: And therefore *Vinegar* will not burne; For that much of the Finer Parts is exhaled. 313

The *Refreshing* and *Quickning* of *Drinke* Palled, or Dead, is by *Enforcing* the *Motion* of the *Spirit*: So we see that *Open Weather* relaxeth the *Spirit*, and maketh it more lively in *Motion*. We see also *Bottelling* of *Beere*, or *Ale*, while it is New, and full of *Spirit*, (so that it spirteth when the Stopple is taken forth) maketh the *Drinke* more quick and windie. A *Pan* of *Coales* in the *Cellar* doth likewise good, and maketh the *Drinke* worke againe. *New Drink* put to *Drinke* that is *Dead*, provoketh it to worke againe: Nay, which is more, (as some affirme,) *A Brewing of New Beere*, set by *Old Beere*, maketh it worke againe. It were good also to *Enforce* the *Spirits* by some *Mixtures*, that may excite and quicken them; As by putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. We see *Creame* is *Matured*, and made to rise more speedily, by Putting in *Cold Water*; which, as it seemeth, getteth downe the *Whey*. 314

It is tried, that the *Burying* of *Bottles of Drinke* well stopped, either in *drie Earth*, a good depth; Or in the *Bottome* of a *Well within Water*; And best of all the *Hanging* of them in a *deepe Well* somewhat *above the Water*, for some fortnights space, is an Excellent *Meanes* of making *Drinke* fresh, and quick 315

quick: for the *Cold* doth not cauſe any Exhaling of the *Spirits* at all; As *Heat* doth, though it rarifieth the reſt that remaine: But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they incorporate the Parts of the *Liquour* perfectly.

316 As for the *Maturation of Fruits*; Itis wrought by the *Calling forth of the Spirits of the Body outward*, and ſo *Spreading* them more *ſmoothly*: And likewiſe by *Digeſting*, in ſome degree, *the Groſſer Parts*: And this is Effected, by *Heat*; *Motion*; *Attraction*; And by a *Rudiment* of *Putrefaction*: For the Inception of *Putrefaction* hath in it a *Maturation*.

317 There were taken *Apples*, and laid in *Straw*; In *Hay*; In *Flower*; In *Chalke*; In *Lime*; Covered over with *Onions*; Covered over with *Crabs*; Cloſed up in *Wax*; Shut in a *Box*: &c. There was alſo an *Apple* hanged up in *Smoake*: Of all which the *Experiment* ſorted in this Manner.

318 After a Moneths Space, the *Apple* Encloſed in *Wax*, was as Greene and Freſh as at the firſt Putting in, and the *Kernells* continued White. The *Cauſe* is, for that all *Excluſion* of *Open Aire*, (which is ever Predatory) maintaineth the Body in his firſt Freſhneſſe, and Moiſture: But the Inconvenience is, that it taſteth a little of the *Wax*: Which, I ſuppoſe, in a *Pomgranate*, or ſome ſuch thick-coated *Fruit*, it would not doe.

319 The *Apple* Hanged in the *ſmoake*, turned like an Old Mellow *Apple*, Wrinkled, Drie, Soft, Sweet, Yellow within. The *Cauſe* is, for that ſuch a degree of *Heat*, which doth neither Melt, nor Scorch, (For we ſee that in a greater *Heat*, a *Roaſt Apple* Softneth and Melteth, And *Pigs feet*, made of Quarters of *Wardens*; ſcortch and have a skinne of Cole) doth Mellow, and not Adure: The *Smoake* alſo maketh the *Apple* (as it were) ſprinkled with *Soot*, which helpeth to *Mature*. We ſee that in *Drying* of *Peares*, and *Prunes*, in the Oven, and Removing of them often as they begin to Sweat, there is a like Operation; But that is with a farre more Intenſe degree of *Heat*.

320 The *Apples* covered in the *Lime* and *Aſhes*, were well *Matured*; As appeared both in their Yellowneſſe, and Sweetneſſe. The *Cauſe* is, for that that *Degree of Heat* which is in *Lime*, and *Aſhes*, (being a Smoothering *Heat*) is of all the reſt moſt Proper; for it doth neither Liquefie, nor Arefie; And that is true *Maturation*. Note that the Taſte of thoſe *Apples* was good; And therefore it is the *Experiment* fitteſt for Uſe.

321 The *Apples*, *Covered* with *Crabs*, and *Onions*, were likewiſe well *Matured*. The Cauſe is, not any *Heat*; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and ſpread them equally thorowout the *Body*; which taketh away Hardneſſe. So we ſee one *Apple* ripeneth againſt another. And therefore in making of *Cider*, they turne the *Apples* firſt upon a heape. So one *Cluſter* of *Grapes*, that toucheth another whileſt it groweth, ripeneth faſter; *Botrus contra Botrum citius matureſcit*.

322 The *Apples* in *Hay*, and the *Straw*, ripened apparently, though not ſo much as the Other; But the *Apple* in the *Straw* more. The *Cauſe* is, for that the *Hay* and *Straw* have a very low degree of *Heat*, but yet Cloſe and Smoothering, and which drieth not.

323 The *Apple* in the *Cloſe Box*, was ripened alſo: The *Cauſe* is, for that all Aire, kept cloſe, hath a degree of *Warmth*: As we ſee in *Wooll*, *Furre*, *Pluſh*, &c.

Note that all theſe were Compared with another Apple, *of the ſame kind, that lay of it Selfe: And in Compariſon of that, were more Sweet, and more Yellow, and ſo appeared to be more Ripe.*

324 Take an *Apple*, or *Peare*, or other like *Fruit*, and *Rowle* it upon a Table hard: Wee ſee in Common Experience, that the *Rowling* doth Soften and Sweeten

Sweeten the *Fruit* presently; Which is Nothing but the *Smooth Distribution* of the *Spirits* into the Parts: For the *Vnequall Distribution* of the *Spirits* maketh the Harrishnesse: But this Hard *Rowling* is betweene *Concoction*, and a *Simple Maturation*; Therfore, if you should *Rowle* them but gently, perhaps twice a day; And continue it some seven dayes, it is like they would *mature* more finely, and likeunto the *Naturall Maturation*.

325 Take an *Apple*, and cut out a Peece of the Top, and cover it, to see whether that *Solution of Continuitie* will not hasten a *Maturation*: We see that where a *Waspe*, or a *Flie*, or a *Worme* hath bitten, in a *Grape*, or any *Fruit*, it will sweeten hastily.

326 Take an *Apple*, &c. and prick it with a *Pin* full of *Holes*, not deep and smear it a little with *Sacke*, or *Cinnamon Water*, or *Spirit of Wine*, every day for ten dayes, to see if the *Virtuall Heat* of the *Wine*, or *Strong Waters*, will not *Mature* it.

In these Trialls *also, as was used in the first, set another of the same* Fruits *by, to Compare them: And trie them, by their* Yellownesse, *and by their* Sweetnesse.

Experiment Solitary, touching the *Making* of *Gold*.

The World hath been much abused by the Opinion of *Making of Gold*: The *Worke* it selfe I judge to be possible; But the *Meanes* (hitherto propounded) to effect it, are, in the Practice, full of Errour and Impositure; And in the Theory, full of unsound Imaginations. For to say, that *Nature* hath an Intention to make all Metals *Gold*; And that, if she were delivered from Impediments, shee would performe her owne Worke; And that, if the Crudities, Impurities, and Leprosities of *Metals* were cured, they would become *Gold*; And that a little *Quantity* of the *Medicine*, in the Worke of *Projection*, will turne a Sea of the *Baser Metall* into *Gold*, by *Multiplying*: All these are but dreames: And so are many other Grounds of *Alchymy*. And to help the Matter, the *Alchymists* call in likewise many Vanities, out of *Astrology*; *Naturall Magicke*; Superstitious Interpretations of *Scriptures*; Auricular *Traditions*; Faigned Testimonies of *Ancient Authors*; And the like. It is true, on the other side, they have brought to light not a few profitable *Experiments*, and thereby made the World some amends. But we, when we shall come to handle the *Version* & *Transmutation* of *Bodies*; And the *Experiments* concerning *Metals*, and *Mineralls*; will lay open the true Wayes and Passages of *Nature*, which may lead to this great Effect. And we commend the wit of the *Chineses*, who despaire of Making of *Gold*, but are Mad upon the Making of *Silver*: For certain it is, that it is more difficult to make *Gold*, (which is the most Ponderous and Materiate amongst *Metalls*) of other *Metalls*, lesse Ponderous, and lesse Materiate; than (*viâ versâ*) to make *Silver* of *Lead*, or *Quick-Silver*; Both which are more Ponderous than *Silver*; So that they need rather a further

ther Degree of *Fixation*, than any *Condenſation*. In the meane time, by Occaſion of Handling the *Axiomes* touching *Maturation*, we will direct a *Triall* touching the *Maturing* of *Metalls*, and thereby turning ſome of them into *Gold*: For wee conceive indeed, that a perfect good *Concoction*, or *Diſgeſtion*, or *Maturation* of ſome *Metalls*, will produce *Gold*. And here wee call to minde, that we knew a *Dutch-man*, that had wrought himſelfe into the beleefe of a great Perſon, by undertaking that he could make *Gold*: Whoſe diſcourſe was, that *Gold* might be made; But that the *Alchymiſts* Over-fired the Worke: For (he ſaid) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore, that he would doe it with a great Lamp, that ſhould carry a Temperate and Equall Heat: And that it was the Work of many Moneths. The Device of the Lampe was folly; But the Over-firing now uſed; And the Equall Heat to be required; And the Making it a Worke of ſome good Time; are no ill Diſcourſes.

We reſort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The Firſt is, that there be *uſed a Temperate Heat*; For they are ever *Temperate Heats* that *Diſgeſt*, and *Mature*: Wherein we meane *Temperate*, according to the *Nature* of the *Subject*; For that may be *Temperate* to *Fruits*, and *Liquours*, which will not worke at all upon *Metalls*. The Second is, that the *Spirit of the Metall be quickened*, and the *Tangible Parts opened*: For without thoſe two Operations, the *Spirit* of the *Metall*, wrought upon, will not be able to diſgeſt the parts. The Third is, that the *Spirits doe ſpread themſelves Even*, and *move not Subſultorily*; For that will make the Parts Cloſe, and Pliant. And this requireth a Heat, that doth not riſe and fall, but continue as *Equall* as may be. The Fourth is, that *no Part of the Spirit be emitted, but detained*: For if there be *Emiſsion* of *Spirit*, the Body of the *Metall* will be Hard, and Churliſh. And this will be performed, partly by the Temper of the Fire; And partly by the cloſeneſſe of the Veſſell. The Fifth is, that there be *Choice made of the likelieſt and beſt prepared Metall, for the Verſion*: For that will facilitate the Worke. The Sixth is, that you give *Time enough for the Worke*: Not to prolong Hopes (as the Alchymiſts doe;) but indeed to give *Nature* a convenient Space to worke in. Theſe Principles are moſt certaine, and true;

Wee

We will now derive a direction of *Triall* out of them; Which may (perhaps) by further Meditation, be improved.

327 Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* be such, as may keep the *Metall perpetually Moulten*, and no more; For that above all importeth to the Work. For the Materiall, take *Silver*, which is the *Metall* that in Nature Symbolizeth most with *Gold*; Put in also, with the *Silver*, a Tenth Part of *Quick-silver*, and a Twelfth Part of *Nitre*, by weight; Both these to quicken and open the Body of the *Metall*: And so let the Worke be continued by the *Space of Sixe Moneths*, at the least. I wish also, that there be, at some times, an Injection of some *Oyled* Substance; Such as they use in the Recovering of *Gold*, which by Vexing with Separations hath beene made Churlish: And this is, to lay the Parts more Close and Smooth, which is the Maine Work. For *Gold* (as we see) is the Closest (and therefore the Heaviest) of *Metalls*: And is likewise the most Flexible, and Tensible. Note, that to thinke to make *Gold* of *Quick-silver*, because it is the heaviest, is a Thing not to bee hoped; For *Quick-silver* will not endure the Mannage of the *Fire*. Next to *Silver*, I thinke *Copper* were fittest to bee the *Materiall*.

Experiment Solitary touching the *Nature* of *Gold*. 328

Gold hath these *Natures*: *Greatnesse of Weight*; *Closeness of Parts*; *Fixation*; *Pliantnesse*, or *Softnesse*; *Immunitie from Rust*; *Colour* or *Tincture of Yellow*. Therefore the Sure Way, (though most about,) to make *Gold*, is to know the *Causes* of the Severall *Natures* before rehearsed, and the *Axiomes* concerning the same. For if a man can make a *Metall*, that hath all these *Properties*, Let men dispute, whether it be *Gold*, or no?

Experiments in Consort, touching the *Enducing* and *Accelerating* of *Putrefaction*.

The *Enducing* and *Accelerating* of *Putrefaction*, is a Subject of a very Universall Enquiry: For *Corruption* is a Reciprocall to *Generation*: And they Two, are as *Natures* two *Termes* or *Bundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the Worke of the *Spirits* of *Bodies*, which ever are Unquiet to *Get forth*, and *Congregate* with the *Aire*, and to enjoy the *Sunbeames*. The *Getting forth*, or Spreading of the *Spirits*, (which is a Degree of *Getting forth*,) hath five Differing *Operations*. If the *Spirits* be detained within the Bodie, and move more violently, there followeth *Colliquation*; As in *Metalls*, &c. If more Mildely, there followeth *Disgestion*, or *Maturation*; As in *Drinkes*, and *Fruits*. If the *Spirits* be not meerly Detained, but Protrude a little, and that Motion be Confused, and inordinate, there followeth *Putrefaction*; Which ever dissolveth the Consistence of the Body into much Inequalitie; As in *Flesh*, *Rotten Fruits*, *Shining Wood*, &c. And also in the *Rust* of *Metalls*. But if that Motion be in a certain Order, there followeth *Vivification*, and *Figuration*; As both in *Living Creatures* bred of *Putrefaction*, and in *Living Creatures Perfect*. But if the *Spirits* issue out of

the Body, there followeth *Desiccation*, *Induration*, *Consumption*, &c. As in *Bricke*, evaporation of *Bodies Liquid*, &c.

329 The *Meanes* to *Enduce* and *Accelerate Putrefaction*, are; First by *Adding some Crude or Watry Moisture*; As in Wetting of any Flesh, Fruit, Wood, with *Water*, &c. For contrariwise *Fluctuous* and *Oyly Substances* preserve.

330 The Second is by *Invitation* or *Excitation*; As when a *Rotten Apple* lyeth close to another *Apple* that is *Sound*: Or when *Dung* (which is a Substance already Putrified) is added to other Bodies. And this is also notably seene in *Church-yards*, where they bury much; Where the Earth will consume the *Corps*, in farre shorter time, than other Earth will.

331 The Third is, by *Closenesse*, and *Stopping*, which *detaineth* the *Spirits*, *in Prison*, more than they would; And thereby irritateth them to seeke Issue; As in Corne, and Cloaths, which waxe Musty; and therefore Open Aire, (which they call *Aer perflabilis*) doth preserve: And this doth appeare more evidently in *Agues*, which come (most of them,) of *Obstructions*, and *Penning* the *Humours*, which thereupon *Putrifie*.

332 The Fourth is, by *Solution of Continuitie*; As we see an Apple will rot sooner, if it be Cut or Pierced; And so will Wood, &c. And so the Flesh of Creatures alive, where they have received any Wound.

333 The Fifth is, either by the *Exhaling*, or by the *Driving back* of the *Principall Spirits*, which preserve the Consistence of the *Body*; So that when their Government is dissolved, every *Part* returneth to his Nature, or Homogeny. And this appeareth in *Vrine*, and *Bloud*, when they coole, and thereby breake; It appeareth also in the *Gangrene*, or *Mortification* of *Flesh*, either by *Opiates*, or by *Intense Colds*. I conceive also the same Effect is in *Pestilences*, for that the *Malignitie* of the *Infecting Vapour*, daunceth the *Principall Spirits*, and maketh them flie, and leave their *Regiment*; And then the *Humours*, *Flesh*, and *Secondary Spirits*, doe dissolve, and breake, as in an *Anarchy*.

334 The Sixth is, when a *Forraine Spirit*, *Stronger and more Eager than the Spirit of the Body*, *entreth the Body*; As in the Stinging of Serpents. And this is the *Cause* (generally) that upon all *Poysons* followeth *Swelling*: And we see *Swelling* followeth also, when the *Spirits* of the *Body* it self, Congregate too much; As upon *Blowes*, and *Bruises*; Or when they are *Pent in too much*, as in *Swelling* upon *Cold*. And we see also, that the *Spirits* coming of *Putrefaction* of *Humours* in *Agues*, &c. Which may bee counted as *Forraine Spirits*, though they be bred within the Body, do Extinguish and Suffocate the *Naturall Spirits*, and *Heat*.

335 The Seventh is, by such a *Weak Degree of Heat*, *as setteth the Spirits in a little Motion*, *but is not able*, *either to digest the Parts*, *or to Issue the Spirits*; As is seene in Flesh kept in a Roome that is not Coole; Whereas in a Coole and Wet Larder it will keep longer. And we see, that *Vivification* (whereof *Putrefaction* is the *Bastard Brother*,) is effected by such Soft Heats; As the Hatching of Egges; The Heat of the Wombe, &c.

336 The Eight is, by the *Releasing of the Spirits*; which before were close kept by the Solidnesse of their Coverture, and thereby their Appetite of Issuing checked; As in the *Artificiall Rusts* induced by strong Waters, in *Iron*, *Lead*, &c. And therefore *Wetting* hasteneth *Rust*, or *Putrefaction* of any thing, because it softneth the Crust, for the *Spirits* to come forth.

337 The Ninth is, by the *Enterchange of Heat and Cold*, or *Wet and Dry*; As we see in the Mouldring of Earth in Frosts, and Sunne; And in the more hasty Rotting of Wood, that is sometimes wet, sometimes dry.

The

The Tenth is, by *Time, and the Worke and Procedure of the Spirits themselves*, which cannot keep their Station; Especially if they be left to themselves; And there be not Agitation or Locall Motion. As we see in Corn not stirred; And Mens Bodies not exercised. 338

All *Moulds* are Inceptions of *Putrefaction*; As the *Moulds* of *Pyes*, and *Flesh*; the *Moulds* of *Orenges*, and *Limons*; which *Moulds* afterwards turn into Wormes, or more odious *Putrefactions*: And therefore (commonly) prove to be of ill Odour. And if the Body be Liquid, and not apt to putrifie totally, it will cast up a *Mother* in the Top; As the *Mothers* of *Distilled Waters*. 339

Mosse is a Kinde of *Mould*, of the Earth, and Trees. But it may be better sorted as a *Rudiment* of *Germination*; To which we referre it. 340

Experiments in Consort, touching *Probibiting* and *Preventing Putrefaction.*

It is an *Enquiry* of Excellent use, to Enquire of the *Meanes* of *Preventing* or *Staying* of *Putrefaction*; For therein consisteth the *Meanes* of *Conservation* of *Bodies*; For *Bodies* have two Kindes of *Dissolutions*; The one by *Comsumption*, and *Desiccation*; The other by *Putrefaction*. But as for the *Putrefactions* of the *Bodies* of *Men*, and *Living Creatures* (as in Agues, Worms, Consumptions of the Lungs, Impostumes, and Ulcers both Inwards and outwards,) they are a great *Part of Physicke*, and *Surgery*; And therefore we will reserve the *Enquiry* of them to the proper Place, where wee shall handle *Medicinall Experiments* of all Sorts. Of the rest wee will now Enter into an Enquiry: wherein much light may be taken, from that which hath beene said, of the *Meanes* to *Enduce* or *Accelerate Putrefaction*: For the Removing that, wich caused *Putrefaction*, doth Prevent and Avoid *Putrefaction*.

The First *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: For so we see that Meat and Drink will last longer, Unputrified, or Unsowred, in Winter, than in Summer: And we see that Flowers, and Fruits, put in Conservatories of Snow, keep fresh. And this worketh by the *Detention* of the *Spirits*, and *Constipation* of the *Tangible Parts*. 341

The Second is *Astriction*: For *Astriction* prohibiteth *Dissolution*: As we see (generally) in *Medicines*, whereof such as are *Astringents* doe inhibite *Putrefaction*: And by the same reason of *Astringency*, some small Quantity of Oile of Vitriol, will keep Fresh Water long from *Putrefying*. And this *Astriction* is in a Substance that hath a *Virtuall Cold*; And it worketh (partly) by the same Meanes that Cold doth. 342

The Third is, the Excluding of the *Aire*; And againe, the *Exposing to the Aire*: For these Contraries, (as it commeth often to passe,) worke the same Effect, according to the Nature of the Subject Matter. So we see, that *Beere*, or *Wine*, in Bottles close stopped, last long; That the *Garners under Ground* keepe Corne longer than those above Ground; And that *Fruit closed in Wax* keepeth fresh: And likewise *Bodies* put in *Honey*, and *Flower*, keepe more fresh: And *Liquours*, *Drinkes*, and *Iuices*, with a little *Oyle* cast on the Top, keepe fresh. Contrariwise, we see that *Cloth* and *Apparell*, not *Aired*, doe breed Moathes, and Mould; and the Diversitie is, that in *Bodies* 343

that need *Detention* of *Spirits*, the *Excluſion of the Aire* doth good; As in *Drinkes*, and *Corne*: But in *Bodies* that need *Emiſſion* of *Spirits*, to diſcharge ſome of the Superfluous Moiſture, it doth hurt, for they require *Airing*.

344 The fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Reſt*; For the Subtill *Motion*, which *Putrefaction* requireth, is diſturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* Integrall, and their Parts together; As wee ſee that Turning over of Corne in a Garner; Or Letting it runne like an Houre-glaſſe, from an upper Roome into a Lower, doth keepe it Sweet: And Running Waters putrifie not: And in Mens Bodies, Exerciſe hindreth *Putrefaction*; And contrariwiſe *Reſt*, and Want of *Motion*, or Stoppings, (whereby the Runne of Humours, or the Motion of Perſpiration, is ſtayed,) further *Putrefaction*; As we partly touched a little before.

345 The Fifth is, the *Breathing forth of the Adventitious Moiſture in Bodies*; For as *Wetting* doth haſten *Putrefaction*; So *Convenient Drying*, (whereby the more *Radicall Moiſture* is onely kept in,) putteth back *Putrefaction*: So we ſee that *Herbs*, and *Flowers*, if they be dried in the Shade; or dried in the hot Sunne, for a ſmall time, keep beſt. For the *Emiſſion* of the *Looſe* and *Adventitious Moiſture*, doth betray the *Radicall Moiſture*; And carryeth it out for Company.

346 The Sixth is, the *Strengthening of the Spirits of Bodies*; For as a *Great Heat* keepeth Bodies from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a Strong *Spirit* likewiſe preſerveth, and a Weake or Faint *Spirit* diſpoſeth to *Corruption*. So we finde that Salt water corrupteth not ſo ſoon as Freſh: And Salting of Oiſters, and Powdring of Meat, keepeth them from *Putrefaction*. It would be tried alſo, whether *Chalke* put into *Water*, or *Drinke*, doth not preſerve it from *Putrefying*, or ſpeedy Souring. So wee ſee that *Strong Beere* will laſt longer than Small; And all Things, that are Hot and Aromaticall, doe helpe to Preſerve Liquours, or Powders, &c. Which they doe, as well by Strengthening the *Spirits*, as by Soaking out the looſe *Moiſture*.

347 The Seventh is, *Separation of the Cruder Parts*, and thereby *making the Body more Equall*; for all unperfect Mixture is apt to *Putrefie*; And Watry Subſtances are more apt to *Putrefie*, than Oyly. So wee ſee Diſtilled Waters will laſt longer than Raw waters; And Things that have paſſed the Fire, doe laſt longer than thoſe that have not paſſed the Fire; as Dried Peares, &c.

348 The Eighth is, the *Drawing forth continually of that part, where the Putrefaction beginneth*: Which is (commonly) the *Looſe and Watry Moiſture*; Not onely for the Reaſon before given, that it provoketh the *Radicall Moiſture* to come forth with it; But becauſe being detained in the Body, the *Putrefaction* taking hold of it, infecteth the reſt: As we ſee in the *Embalming of dead Bodies*: And the ſame Reaſon is of *Preſerving Herbs*, or *Fruits*, or *Flowers*, in *Branne*, or *Meale*.

349 The Ninth is, the *Commixture of any Thing that is more Oily*, or *Sweet*: For ſuch *Bodies* are leſt apt to *Putrefie*, the *Aire* working little upon them; And they not putrefying preſerve the reſt. And therefore we ſee *Syrrups*, and *Ointments*, will laſt longer, than *Iuyces*.

350 The Tenth is, the *Commixture of ſomewhat that is Drie*; For *Putrefaction* beginneth firſt from the *Spirits*; And then from the *Moiſture*: And that that is dry is unapt to putrefie: And therefore Smoake preſerveth Fleſh; As wee ſee in Bacon, and Neats-Tongues, and Martlemas Beefe, &c.

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The Opinion of ſome of the *Ancients*, that *Blowne Aires* doe preſerve Bodies, longer than other *Aires*, ſeemeth to Mee Probable; For that the *Blowne Aires*, being Over-charged and Compreſſed, will hardly receive the Exhaling of any Thing, but rather repulſe it. It was tried in a *Blowne Bladder*, whereinto Fleſh was put, and likewiſe a Flower, and it ſorted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather further *Putrefaction*: The way were therefore, to blow ſtrongly, with a Paire of Bellowes, into a Hogſhead, putting into the Hogſhead (before) that which you would have preſerved; And in the inſtant that you withdraw the Bellowes, ſtop the Hole cloſe.

Experiment Solitary touching *Wood Shining* in the *Darke*.

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THe *Experiment* of *Wood* that *Shineth* in the *Darke*, we have diligently driven, and purſued: The rather, for that of all Things, that give Light here below, it is the moſt Durable; And hath leaſt Apparent Motion. *Fire* and *Flame* are in continuall Expence; *Sugar* ſhineth only while it is in Scraping; And *Salt-water* while it is in Daſhing; *Glow-wormes* have their Shining while they live, or a little after; Onely *Scales* of *Fiſhes* (Putrified) ſeeme to be of the ſame Nature with *Shining Wood*: And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as *Fire*, or *Light*. The *Triall* ſorted thus. 1. The *Shining* is in ſome Peeces more *Bright*, in ſome more *Dimme*; but the moſt *Bright* of all doth not attaine to the Light of a *Glow-worme*. 2. The *Woods* that have beene tried to ſhine, are chiefly *Sallow*, and *Willow*; Alſo the *Aſh*, and *Haſle*; It may be, it holdeth in others. 3. Both *Roots*, and *Bodies* doe ſhine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by Daylight, is in ſome Peeces *White*, in ſome Peeces inclining to *Red*; Which in the Countrey they call the *White*, and *Red Garret*. 5. The Part that Shineth, is, (for the moſt Part) ſomewhat *Soft*, and *Moiſt* to feele to; But ſome was found to be *Firme* and *Hard*; So as it might be figured into a Croſſe, or into Beads, &c. But you muſt not look to have an Image, or the like, in any Thing that is Lightſome; For even a face in Iron red Hot will not be ſeen, the Light confounding the ſmall differences of Lightſome and Darkſome, which ſhew the figure. 6. There was the *Shining Part pared off*, till you came to that, that did not Shine; But within two Dayes the *Part Contiguous* began alſo to *Shine*, being laid abroad in the Dew; So as it ſeemeth the Putrefaction ſpreadeth. 7. There was other dead *Wood* of like kinde, that was *Laid abroad*, which *Shined* not at the firſt; But after a Nights lying abroad began to *Shine*. 8. There was other *Wood*, that did *Firſt Shine*; And being laid drie in the Houſe, within five or ſixe dayes, *Loſt* the *Shining*; And laid abroad again, *Recovered* the *Shining*. 9. *Shining Woods*, being laid in a *Dry Roome*, within a Seven night, loſt their Shining; But being laid in a *Cellar*, or *Danke Roome*, kept the *Shining*. 10. The *Boring of Holes*, in that kinde of Wood, and then laying it abroad, ſeemeth to conduce to make it *Shine*: The *Cauſe* is, for that all *Solution* of *Continuity* doth help on *Putrefaction*, as was touched before. 11. No *Wood* hath beene yet tried to *Shine*, that was cut *downe alive*, but ſuch as was *Rotted*, both in Stocke, and Root, while it grew. 12. Part of the *Wood* that *Shined*, was *ſteeped in Oyle*, and retained the *Shining* a Fortnight. 13. The like ſucceeded in ſome *Steeped* in *Water*, and much better. 14 How long the *Shining* will continue, if the *Wood* be *laid abroad every Night*, and *taken in* and *Sprinkled* with *Water* in the *Day*, is not yet tryed. 15. Triall was made of *laying it abroad in Froſtie weather*, which hurt it not. 16. There was a great *Peece* of a *Root* which did ſhine, and the *Shining Part* was *Cut off*, till no more Shined;

Shined; Yet after two Nights, though it were kept in a drie Room, it got a *Shining*.

Experiment Solitary touching the *Acceleration* of *Birth*. 353

THe *Bringing forth* of *Living Creatures* may be *accelerated* in two Respects: The one, if the *Embryon ripeneth* and perfecteth sooner: The other, if there be some Cause from the *Mothers Body*, of *Expulsion* or Putting it downe: whereof the Former is good, and argueth Strength; The Latter is ill, and commeth by Accident or Disease. And therefore the Ancient *Observation* is true, that the *Childe borne in the Seventh Moneth*, doth commonly well; But *Borne in the Eighth Moneth*, doth (for the most part) die. But the *Cause* assigned is Fabulous; Which is, that in the Eighth Moneth, should be the returne of the Raigne, of the *Planet Saturne*: which (as they say) is a *Planet* Maligne; whereas in the Seventh is the Raigne of the *Moone*, which is a Planet Propitious. But the true *Cause* is, for that where there is so great a Prevention of the Ordinary time, it is the *lustinesse* of the *Childe*; But when it is lesse, it is some *indisposition* of the *Mother*.

Experiment Solitary touching the *Acceleration* of *growth* and *Stature*. 354

TO *Accelerate Growth* or *Stature*, it must proceed; Either from the *Plenty* of the *Nourishment*; Or from the *Nature* of the *Nourishment*; Or from the *Quickening* and *Exciting* of the *Naturall Heat*. For the first, *Excesse* of *Nourishment* is hurtfull; For it maketh the Childe Corpulent; And Growing in Breadth, rather than in Height. And you may take an Experiment from *Plants*, which, if they spread much, are seldome tall. As for the *Nature* of the *Nourishment*; First, it may not be too *Drie*; And therefore Children in Dayrie Countries doe waxe more tall, than where they feed more upon Bread, and Flesh. There is also a received Tale; That boyling of *Daisie Roots* in *Milke* (which it is certain are great Driers) will make *Dogs* little. But so much is true, that an *Over-Drie Nourishment* in Childhood putteth backe Stature. Secondly, the *Nourishment* must be of an *Opening Nature*; For that Attenuateth the Juyce, and furthereth the Motion of the Spirits, upwards. Neither is it without cause, that *Xenophon*, in the *Nouriture* of the *Persian Children*, doth so much commend their Feeding upon *Cardamon*; which (he saith) made them grow better, and bee of a more Active Habit. *Cardamon* is in Latine *Nasturtium*; And with us *Water-Cresses*; Which, it is certaine, is an Herbe, that whilest it is young, is Friendly to Life. As for the *Quickening* of *Naturall Heat*, it must be done chiefly with *Exercise*; And therefore (no doubt) much Going to Schoole, where they sit so much, hindreth the *Growth* of *Children*; whereas Countrey-People, that goe not to Schoole, are commonly of better Stature. And againe Men must beware how they give *Children*, any thing that is *Cold* in Operation; For even *Long Sucking* doth hinder both *wit*, and *Stature*. This hath beene tryed, that a Whelpe, that hath beene fed with *Nitre* in *Milke*, hath become very little, but extreme lively: For the *Spirit* of *Nitre* is *Cold*. And though it be an Excellent Medicine, in Strength of yeares, for Prolongation of Life; yet it is, in Children and young Creatures, an Enemy to *Growth*: And all for the same Reason; For *Heat* is requisite to Growth: But after a Man is come to his Middle Age, *Heat* consumeth the Spirits; which the Coldnesse of the Spirit of *Nitre* doth helpe to condense, and correct.

Experiments in Consort touching *Sulphur* and *Mercury*, two of *Paracelsus* Principles.

There bee two *Great Families* of *Things*; You may terme them by severall Names; *Sulphureous* and *Mercureall*, which are the *Chymists* Words: (For as for their *Sal*, which is their Third Principle,

Principle, it is a Compound of the other two;)*Inflammable*, and *Not Inflammable*; *Mature* and *Crude*; *Oily* and *Watry*. For wee see that in *Subterranies* there are, as the *Fathers* of their *Tribes*, *Brimstone* and *Mercury*: In *Vegetables*, and *Living Creatures* there is *Water* and *Oile*: In the *Inferiour Order* of *Pneumaticalls* there is *Aire* and *Flame*: And in the *Superiour*, there is the *Body* of the *Starre*, and the *Pure Sky*. And these Paires, though they be unlike in the Primitive Differences of Matter, yet they seeme to have many Consents: For *Mercury* and *Sulphure* are principall Materialls of *Metalls*; *Water* and *Oyle*, are principall Materialls of *Vegetables*, and *Animals*; And seeme to differ but in *Maturation*, or *Concoction*: *Flame* (in Vulgar Opinion) is but *Aire Incensed*; And they both have Quickness of Motion, and Facilitie of Cession, much a like: And the *Interstellar Sky*, (though the Opinion be vaine, that the *Starre* is the *Denser Part* of his *Orbe*,) hath notwithstanding so much Affinity with the *Starre*, that there is a Rotation of that, as well as of the *Starre*. Therefore, it is one of the greatest *Magnalia Naturæ*, to turne *Water* or *Watry Iuyce* into *Oile* or *Oily* Juyce: Greater in Nature, than to turne *Silver*, or *Quick-silver*, into *Gold*.

The Instances we have, wherein *Crude* and *Watry* Substance turneth into *Fat* and *Oily*, are of foure kindes. First in the *Mixture* of *Earth* and *Water*; which mingled by the help of the Sunne, gather a Nitrous Fatnesse, more than either of them have severally; As we see, in that they put forth *Plants*, which need both Juyces. 355

The Second is in the *Assimilation* of *Nourishment*, made in the *Bodies* of *Plants*, and *Living Creatures*; Whereof *Plants* turne the Juyce of meere *Water* and *Earth*, into a great deale of *Oily Matter*: *Living Creatures*, though much of their *Fat*, and *Flesh*, are out of *Oily Aliments*, (as *Meat*, and *Bread*,) yet they Assimilate also in a Measure their *Drink* of *Water*, &c. But these two Wayes of *Version* of *Water* into *Oyle*, (namely by *Mixture*, and by *Assimilation*) are by many Passages, and Percolations, and by long Continuance of soft *Heats*, and by Circuits of Time. 356

The third is in the *Inception* of *Putrefaction*; As in *Water Corrupted*; And the *Mothers* of *Waters Distilled*; Both which have a kinde of *Fatnesse*, or *Oyle*. 357

The Fourth is in the *Dulcoration* of some *Metalls*; As *Saccharum Saturni*, &c. 358

The Intension of *Version* of *Water* into a more *Oyly Substance*, is by *Digestion*; For *Oile* is almost Nothing else but *Water Digested*; And this *Digestion* is principally by *Heat*; Which *Heat* must be either *Outward*, or *Inward*: Againe, it may be by Provocation, or Excitation; Which is caused by the Mingling of Bodies already *Oily*, or *Digested*; For they will somewhat Communicate their Nature with the rest. *Digestion* also is strongly effected by direct *Assimulation*, of *Bodies Crude* into *Bodies Digested*; As in *Plants*, and *Living Creatures*, whose Nourishment is farre more Crude than their Bodies: 359

dies: But this *Digestion* is by a great Compasse, as hath beene said. As for the more full Handling of these two Principles, whereof this is but a Taste; (the Enquiry of which is one of the Profoundest Enquiries of Nature,) We leave it to the *Title* of *Version* of *Bodies*; And likewise to the *Title* of the *First Congregations* of *Matter*; Which like a Generall Assembly of Estates, doth give Law to all *Bodies*.

Experiment Solitary touching *Chameleons*. 360

A *Chameleon* is a Creature about the Bignesse of an Ordinary *Lizard*: His Head unproportionably bigge; His eyes great: He mooveth his Head without the writhing of his Necke, (which is inflexible,) as a *Hogge* doth: His Backe crooked; His Skinne spotted with little Tumours, lesse Eminent nearer the Belly; His Taile slender, and long: On each Foot he hath five Fingers; three on the Outside, and two on the Inside; His Tongue of a marvellous Length in respect of his Body, and hollow at the end; which he will launch out to prey upon *Flies*. Of Colour Green, and of a dusky Yellow, brighter and whiter towards the Belly; Yet spotted with Blew, White, and Red. If he be laid upon Green, the Greene predominateth; If upon Yellow, the Yellow; Not so if he be laid upon Blew, or Red, or White; Onely the Greene Spots receive a more Orient Lustre; Laid upon Blacke, hee looketh all Blacke, though not without a Mixture of Greene. He feedeth not onely upon Aire, (though that be his principall Sustenance;) For sometimes he taketh *Flies*, as was said; Yet some that have kept *Chameleons* a whole yeare together, could never perceive that ever they fed upon any Thing else but Aire; And might observe their Bellies to swell after they had exhausted the Aire, and closed their Jawes; Which they open commonly against the Rayes of the Sunne. They have a foolish Tradition in *Magicke*, that if a *Chameleon* be burnt upon the Top of an House, it will raise a Tempest. Supposing (according to their vain Dreams of *Sympathies*) because he nourisheth with Aire, his Body should have great vertue to make Impression upon the Aire.

Experiment Solitary touching *Subterrany Fires*. 361

IT is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions* of *Flames* out of *Plaines*; And that those *Flames* are cleare, and cast not forth such Smoake, and Ashes, and Pummice, as *Mountaine Flames* doe. The Reason (no doubt) is, because the *Flame* is not pent, as it is in *Mountains*, and *Earthquakes* which cast *Flame*. There be also some *Blinde Fires*, under *Stone*, which flame not out, but *Oile* being powred upon them, they flame out. The Cause whereof is, for that it seemeth, the *Fire* is so choaked, as not able to remove the Stone, it is *Heat*, rather than *Flame*; Which nevertheless is sufficient to Enflame the *Oile*.

Experiment Solitary touching *Nitre*. 362

IT is reported, that in some *Lakes*, the *Water* is so *Nitrous*, as if Foule Cloaths be put into it, it scoureth them of it selfe: And if they stay any whit long, they moulder away. And the scouring Vertue of *Nitre* is the more to be noted, because it is a *Body Cold*; And we see *Warme Water* scoureth better than *Cold*. But the Cause is, for that it hath a Subtill Spirit, which severeth and divideth any thing that is foule, and Viscous, and sticketh upon a Body.

Experiment Solitary touching *Congealing* of *Aire*. 363

TAke a *Bladder*, the greatest you can get; Fill it full of Winde, and tye it about the Neck with a Silke thred waxed; And upon that likewise Wax very close; So that when the Neck of the *Bladder* drieth, no *Aire* may possibly get in, nor out. Then bury it three or foure foot under the *Earth*, in a *Vault*, or in a *Conservatory* of *Snow*; the *Snow* being made hollow about the *Bladder*;

Bladder; And after some Fortnights distance, see whether the *Bladder* bee shrunke: For if it bee, then it is plaine, that the *Coldnesse* of the *Earth* or *Snow*, hath Condensed the *Aire*, and brought it a Degree nearer to *Water*: Which is an *Experiment* of great Consequence.

Experiment Solitary touching *Congealing* of *Water* into *Chrystall*. 364

IT is a Report of some good credit, that in *Deepe Caves*, there are *Pensile Chrystall*, and *Degrees* of *Chrystall* that drop from above; And in some other, (though more rarely) that rise from below. Which though it bee chiefly the Worke of Cold, yet it may be, that Water, that passeth thorow the Earth, gathereth a Nature more clammy, and fitter to Congeale, and becomes Solide, than Water of it selfe. Therefore Triall would bee made, to lay a Heape of Earth, in great Frosts, upon a Hollow Vessell, putting a Canvase betweene, that it falleth not in: And poure Water upon it, in such Quantity as will be sure to soake thorow; And see whether it will not make an harder Ice in the bottome of the Vessell, and lesse apt to dissolve, than ordinarily. I suppose also, that if you make the Earth narrower at the bottome, than at the Top, in fashion of a Sugar Loafe Reversed, it will help the Experiment. For it will make the Ice, where it Issueth, lesse in Bulk; And evermore Smalnesse of Quantity is a Helpe to *Version*.

Experiment Solitary touching *Preserving* of *Rose leaves* both in *Colour* and *Smell*. 365

TAke *Damaske Roses*, and pull them; Then drie them upon the Top of of an House, upon a Lead or Tarras, in the Hot Sunne, in a cleare day, between the Houres (onely) of twelve and two; or thereabouts. Then put them into a Sweet *Drie Earthen Bottle*, or a *Glasse* with narrow Mouthes, stuffing them close together, but without Bruising: Stop the *Bottle*, or *Glasse*, close, and these *Roses* will retaine, not onely their Smell Perfect, but their Colour fresh, for a yeare at least. Note, that Nothing doth so much destroy any Plant, or other body, either by *Putrefaction*, or *Arefaction*, as the *Adventitious Moisture*, which hangeth loose in the Body, if it be not drawne out. For it betrayeth and tolleth forth the *Innate* and *Radicall Moisture* along with it, when it self goeth forth. And therefore in *Living Creatures*, Moderate Sweat doth preserve the Juyce of the Body. Note that these *Roses*, when you take them from the *Drying*, have little or no *Smell*; So that the Smell is a Second *Smell*, that issueth out of the *Flower* afterwards.

Experiments in Consort touching the *Continuance* of *Flame*. 366

THe *Continuance* of *Flame*, according unto the diversity of the *Body Enflamed*, and other Circumstances, is worthy the Enquiry; Chiefly, for that though *Flame* be (almost) of a Momentany Lasting, yet it receiveth the More, and the Lesse: we will first therefore speake (at large) of *Bodies Enflamed*, wholly, and Immediately, without any *Wieke* to helpe the *Inflammation*. A Spoonefull of *Spirit* of *Wine*, a little heated, was taken, and it burnt as long as came to 116. Pulses. The same Quantity of *Spirit* of *Wine*, Mixed with the Sixth Part of a Spoonefull of *Nitre* burnt but to the space of 94. Pulses. Mixed with the like Quantity of *Bay-salt*, 83. Pulses. Mixed with the like Quantity of *Gunpowder*, which dissolved into a Blacke water, 110 Pulses. A Cube, or Pellet of *Yellow Waxe*, was taken, as much as halfe the *Spirit* of *Wine*, and set in the Middest, and it burnt onely to the space of 87. Pulses. Mixed with the Sixth Part of a spoonefull of *Milke*, it burnt to the space of 100. Pulses; And the *Milke* was crudled. Mixed with the Sixth Part of a spoonefull of *Water*, it burnt to the space of 86. Pulses; With an *Equall Quantity* of *Water*, onely to the space of 4. Pulses. A small *Pebble* was laid in the Middest, and the *Spirit* of *Wine* burnt to the space of 94. Pulses.

Pulſes. A Peece of *Wood*, of the Bigneſſe of an Arrow, and about a Fingers length, was ſet up in the Middeſt, and the *Spirit* of *Wine* burnt to the ſpace of 94. Pulſes. So that the *Spirit* of *Wine Simple*, endured the longeſt; And the *Spirit* of *Wine* with the *Bay-ſalt*, and the *Equall Quantity* of *Water*, were the ſhorteſt.

367 Conſider well, whether the more ſpeedy *Going forth of the flame*, be cauſed, by the *Greater Vigour* of the *Flame* in *Burning*; Or by the *Reſiſtance* of the *Body mixed*, and the *Averſion* thereof to take *Flame*: Which will appeare by the Quantity of the *Spirit* of *Wine*, that remaineth after the Going out of the *Flame*. And it ſeemeth clearly to bee the latter; For that the Mixture of Things leaſt apt to burne, is the Speedieſt in going out. And note, by the way, that *Spirit* of *Wine* burned, till it goe out of it ſelf, will burne no more; And taſteth nothing ſo hot in the Mouth as it did; No nor yet ſowre, (as if it were a degree towards *Vinegar*,) which *Burnt Wine doth*; but flat and dead.

368 Note, that in the *Experiment* of *Wax* aforeſaid, the *Wax* diſſolved in the burning, and yet did not incorporate it ſelf, with the *Spirit* of *Wine*, to produce one *Flame*; but whereſoever the *Wax* floated, the *Flame* forſooke it, till at laſt it ſpread all over, and put the *Flame* quite out.

369 The *Experiments* of the *Mixtures* of the *Spirit* of *Wine enflamed*, are Things of diſcovery, and not of Uſe: But now we will ſpeake of the *Continuance* of *Flames*, ſuch as are uſed for *Candles*, *Lamps*, or *Tapers*; conſiſting of *Inflamable Matters*, and of a *Wieke* that provoketh *Inflamation*. And this importeth not onely Diſcovery, but alſo Uſe and Profit; For it is a great Saving in all ſuch Lights, if they can be made as faire and right as others, and yet laſt longer. *Waxe Pure* made into a Candle, and *Waxe Mixed* ſeverally into Candle-ſtuffe, with the Particulars that follow; (viz. *Water*, *Aqua-vitæ*, *Milke*, *Bay-ſalt*, *Oyle*, *Butter*, *Nitre*, *Brimſtone*, *Saw-duſt*,) Every of theſe bearing a Sixth Part to the *Wax*; And every of theſe *Candles Mixed*, being of the ſame Weight and Wieke, with the *Wax Pure*, proved thus in the Burning, and Laſting. The Swifteſt in Conſuming was that with *Saw-duſt*; Which firſt burned faire till ſome part of the *Candle* was conſumed, and the Duſt gathered about the Snaſte; But then it made the Snaſte bigge, and long, and to burne duskiſhly, and the *Candle* waſted in halfe the time of the *Wax Pure*. The next in Swiftneſſe, were the *Oyle*, and *Butter*, which conſumed, by a Fifth part, ſwifter than the *Pure Wax*. Then followed in Swiftneſſe the *Cleare Wax* it ſelfe. Then the *Bay-Salt*, which laſted about an Eighth part longer than the *Cleare Wax*. Then followed the *Aqua-vitæ*, which laſted about a Fifth part longer than the *Cleare Wax*. Then followed the *Milke*, and *Water*, with little difference from the *Aqua-vitæ*, but the *Water* ſloweſt. And in theſe foure laſt, the *Wieke* would ſpit forth little Sparks. For the *Nitre*, it would not hold lighted above ſome Twelve Pulſes: But all the while it would ſpit out Portions of *Flame*, which afterwards would go out into a vapour. For the *Brimſtone*, it would hold lighted, much about the ſame with the *Nitre*; But then after a little while, it would harden and cake about the Snaſte; So that the Mixture of *Bay-Salt* with *Wax*, will winne an Eighth part of the time of laſting, and the *Water* a Fifth.

370 After the Severall *Materialls* were tried, Triall was likewiſe made of ſeverall *Wiekes*; As of Ordinary *Cotton*; *Sowing Thred*; *Ruſh*; *Silke*; *Straw*; and *Wood*. The *Silke*, *Straw*, and *Wood*, would flame a little, till they came to the *Wax*, and then goe out: of the Other Three, the *Thred* conſumed faſter than the *Cotten*, by a Sixth part of Time: The *Cotten* next: Then the *Ruſh* conſumed

sumed slower than the *Cotton*, by at least a third part of time. For the Bigness of the *Flame*, the *Cotton*, and *Thred*, cast a *Flame* much alike; and the *Rush* much lesse, and dimmer. *Quære*, whether *Wood*, and *Wickes* both, as in *Torches*, consume faster, than the *Wickes Simple*?

We have spoken of the Severall *Materialls*, and the Severall *Wickes*: But to the *lasting* of the *Flame*, it importeth also; Not only what the *Materiall* is, but in the same *Materiall*, whether it be Hard, Soft, Old, New &c. Good *Housewives*, to make their *Candles* burne the longer, use to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and so they Consume the slower: Insomuch, as by this meanes, they will out-last other *Candles*, of the same stuffe, almost Halfe in Halfe. For *Bran* and *Flower* have a Vertue to Harden: So that both Age, and lying in the Bran, doth help to the Lasting. And wee see that *Wax Candles* last longer than *Tallow Candles*, because *Wax* is more firme, and hard. 371

The *Lasting* of *Flame* also dependeth upon the *easie Drawing* of the *Nourishment*; As we see in the *Court* of *England*, there is a Service which they call *All-night*; which is (as it were) a great Cake of wax, with the Wicke in the Middest; whereby it commeth to passe, that the Wicke fetcheth the Nourishment further off. We see also that *Lamps* last longer, because the vessell is farre broader, than the Bredth of a Taper, or Candle. 372

Take a *Turreted Lampe* of *Tinne*, made in the forme of a Squire; The Heighth of the *Turret* being thrice as much, as the length of the lower part, whereupon the *Lampe* standeth: Make only one Hole in it, at the End of the Returne furthest from the *Turret*. Reverse it, and fill it full of *Oile*, by that Hole; And then set it upright againe; And put a Wicke in at the Hole; And lighten it: You shall finde, that it will burne slow, and a long time. Which is caused, (as was said last before,) for that the *Flame* fetcheth the *Nourishment a farre off*. You shall finde also, that as the *Oile* wasteth, and descendeth, so the Top of the *Turret*, by little and little, filleth with Aire; which is caused by the Rarefaction of the oile by the Heat. It were worthy the Observation, to make a Hole, in the Top of the *Turret*, and to trie, when the *Oile* is almost consumed, whether the *Aire* made of the *Oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enflame. It were good also to have the *Lampe* made, not of *Tinne*, but of *Glasse*, that you may see how the Vapour, or Aire gathereth, by degrees, in the Top. 373

A fourth Point, that importeth the *lasting* of the *Flame*, is the *Closeness* of the *Aire*, wherein the *Flame* burneth. Wee see, that if *Wind* bloweth upon a *Candle*, it wasteth apace. We see also, it lasteth longer in a *Lanthorne*, than at *large*. And there are Traditions of *Lamps*, and *Candles*, that have burnt a very long time, in *Caves*, and *Tombes*. 374

A Fifth Point, that importeth the *Lasting* of the *Flame*, is the *Nature* of the *Aire*, where the *Flame* burneth; whether it be Hot or Cold; Moist or Drie. The *Aire*, if it be very *Cold*, irritateth the *Flame*, and maketh it burne more fiercely; (As Fire scorcheth in Frostie weather;) And so furthereth the *Consumption*. The *Aire* once heated, (I conceive) maketh the *Flame* burne more mildly, and so helpeth the *Continuance*. The *Aire*, if it be *Drie*, is indifferent: The *Aire*, if it be *Moist*, doth in a Degree quench the *Flame*: (As wee see *Lights* will go out in the *Damps* of *Mines*:) And howsoever maketh it burne more dully: And so helpeth the *Continuance*. 375

Experiments in Consort, touching *Burialls* or *Infusions* of diuers *Bodies* in *Earth*.

Burialls in *Earth* serue for *Preservation*; And for *Condensation*; And for *Induration* of *Bodies*. And if you intend *Condensation*, or *Induration*, you may 376

may bury the *Bodies* so, as *Earth* may touch them: As if you will make *Artificiall Porcellane*, &c. And the like you may do for *Conservation*, if the *Bodies* be Hard, and Solid; As Clay, Wood, &c. But if you intend *Preservation* of *Bodies*, more Soft and Tender, then you must doe one of these two: Either you must put them in *Cases*, whereby they may not touch the *Earth*; Or else you must *vault* the *Earth*, whereby it may hang over them, and not touch them; For if the *Earth* touch them, it will doe more hurt, by the Moisture, causing them to putrifie, than good by the virtuall Cold, to conserve them; Except the *Earth* be very Drie, and Sandie.

377 An *Orenge*, *Limon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Fortnights Space, foure Foot deepe within the Earth, though it were in a Moist Place, and a Rainie Time, yet came forth, no wayes mouldie, or Rotten, but were become a little harder than they were; Otherwise fresh in their Colour; But their Juyce somewhat flatted. But with the *Buriall* of a Fortnight more they became Putrified.

378 A *Bottle* of *Beere*, *buried* in like manner, as before, became more lively, better tasted, and Clearer, than it was. And a *Bottle* of *Wine* in like manner. A *Bottle* of *Vinegar*, so buried, came forth more lively, and more Odoriferous, smelling almost like a Violet. And after the whole Moneths *Buriall*, all the Three came forth, as fresh and lively, if not better, than before.

379 It were a profitable *Experiment*, to preserve *Orenges*, *Limons*, and *Pomgranates*, till Summer; For then their Price will be mightily increased. This may be done, if you put them in a Pot or Vessell, well covered, that the *Moisture* of the *Earth* come not at them; Or else by putting them in a *Conservatory* of *Snow*. And generally, whosoever will make *Experiments* of *Cold*, let him be provided of three Things; A *Conservatory* of *Snow*; A good *large Vault*, twenty foot at least under the Ground; And a *Deepe Well*.

380 There hath beene a Tradition, that *Pearle*, and *Corall*, and *Turchois-Stone*, that have lost their Colours, may be recovered by *Burying* in the *Earth*: Which is a thing of great profit, if it would sort: But upon Triall of Sixe Weekes *Buriall*, there followed no Effect. It were good to trie it, in a *Deep Well*; Or in a *Conservatory* of *Snow*, where the Cold may be more Constringent; And so make the *Body* more united, and thereby more Resplendent.

Experiment Solitary touching the *Affects in Mens Bodies* from *Severall Winds*.

381 *Mens Bodies* are heavier, and lesse disposed to Motion, when *Southern Winds* blow, than when *Northerne*. The *Cause* is, for that when the *Southerne Winds* blow, the Humours doe (in some Degree) melt, and waxe fluide, and so flow into the Parts; As it is seen in *Wood*, and other *Bodies*; which, when the *Southerne Winds* blow, doe swell. Besides, the Motion and Activity of the Body consisteth chiefly in the Sinewes, which, when the *Southerne Wind* bloweth, are more relax.

Experiment Solitary touching *Winter* and *Summer Sicknesses*.

382 IT is commonly seen, that more are *Sick* in the *Summer*, and more *Dye* in the *Winter*; Except it be in *Pestilent Diseases*, which commonly raigne in *Summer*, or *Autumne*. The Reason is, because *Diseases* are bred (indeed) chiefly by *Heat*; But then they are Cured most by *Sweat*, and *Purge*; which in the *Summer* commeth on, or is provoked, more Easily: As for *Pestilent Diseases*, the Reason why most Dye of them in *Summer*, is because they are bred most in the *Summer*; For otherwise those that are touched are in most danger in the *Winter*.

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THe Generall Opinion is, that *Yeares Hot* and *Moist*, are most *Pestilent*; Upon the Superficiall Ground, that *Heat* and *Moisture* cause *Putrefaction*. In *England* it is found not true; For, many times, there have beene great *Plagues* in *Drie Yeares*. Whereof the Cause may be, for that *Drought* in the Bodies of *Islanders*, habituate to *Moist Aires*, doth Exasperate the Humours, and maketh them more apt to Putrifie, or Enflame: Besides, it tainteth the *Waters* (commonly,) and maketh them lesse wholesome. And againe in *Barbary*, the *Plagues* breake up in the *Summer-moneths*, when the *Weather* is *Hot* and *Dry*.

Experiment Solitary touching *Pestilentiall Seasons*. 383

MAny *Diseases*, (both *Epidemicall*, and others,) breake forth at *Particular times*. And the *Cause* is falsly imputed to the *Constitution* of the *Aire*, at *that time*, when they *breake forth*, or *raigne*; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Yeare*: And therefore *Hippocrates*, in his *Prognosticks*, doth make good Observations, of the *Diseases*, that ensue upon the *Nature*, of the *Precedent foure Seasons* of the *Yeare*.

Experiment Solitary touching an *Errour received* about *Epidemicall Diseases*. 384

TRiall hath beene made, with *Earthen Bottles* well stopped, hanged in a *Well* of Twenty Fathome deepe, at the least; And some of the *Bottles* have beene let downe into the *Water*, some others have hanged above, within about a fathome of the *Water*; And the *Liquours* so tried have beene, *Beere*, (not New, but Ready for drinking,) and *Wine*, and *Milke*. The Proofe hath beene, that both the *Beere*, and the *Wine*, (as well within *Water*, as above,) have not beene palled or deaded at all; But as good, or somewhat better, than *Bottles* of the same *Drinkes*, and Staleneſſe, kept in a *Cellar*. But those which did hang above *Water*, were apparently the best; And that *Beere* did flower a little; whereas that under *Water* did not, though it were Fresh. The *Milke* sowered, and began to Putrifie. Nevertheleſſe it is true, that there is a *Village* neare *Blois*, where in *Deepe Caves* they doe thicken *Milke*; In such sort, that it becommeth very pleasant; Which was some *Cause* of this Triall of Hanging *Milke* in the *Well*: But our proofe was naught; Neither doe I know, whether that *Milke* in those *Caves*, bee first boyled. It were good therefore to trie it with *Milke* Sodden, and with Creame; For that *Milke* of it selfe is such a Compound Body, of *Creame*, *Curds*, and *Whey*, as it is easily Turned, and Dissolved. It were good also to trie the *Beere*, when it is in *Wort*, that it may bee seene, whether the *Hanging* in the *Well*, will Accelerate the *Ripening* and *Clarifying* of it.

Experiment Solitary touching the *Alteration* or *Preservation* of *Liquours* in *Wells*, or *deepe Vaults*. 385

DIvers, we see, doe *Stut*. The *Cause* may bee, (in most,) the *Refrigeration* of the *Tongue*; Whereby it is lesse apt to move. And therefore wee see, that *Naturalls* doe generally *Stut*: And wee see that in those that *Stut*, if they drinke Wine moderately, they *Stut* lesse, because it heateth: And so we see, that they that *Stut*, doe *Stut* more in the first offer to speake, than in Continuance; Because the *Tongue* is, by Motion, somewhat heated. In some also, it may be, (though rarely,) the *Drinesse* of the *Tongue*; which likewise maketh it lesse apt to move, as well as *Cold*; For it is an Affect that it cometh to some *Wise* and *Great Men*; As it did unto *Moses*, who was *Linguæ Prægeditæ*; And many *Stutters* (wee finde) are very *Cholericke Men*; *Choler* Enducing a *Drinesse* in the *Tongue*.

Experiment Solitary, touching *Stutting* 368

Experiments in Consort touching *Smels*.

387 *Smells*, and other *Odours*, are Sweeter in the Aire, at some Distance, than neare the Nose; As hath beene partly touched heretofore. The *Cause* is double: Fitst the finer Mixture, or Incorporation of the *Smell:* For wee see that in *Sounds* likewise, they are Sweetest, when we cannot heare every Part by it selfe. The other *Reason* is, for that all *Sweet Smells* have joyned with them, some *Earthy* or *Crude Odours*; And at some distance the *Sweet*, which is the more Spirituall, is perceived; And the *Earthy* reacheth not so farre.

388 *Sweet Smells* are most forcible, in *Drie Substances*, when they are *Broken*; And so likewise in *Orenges*, or *Limons*, the Nipping of their Rinde, giveth out their *Smell* more: And generally, when *Bodies* are *Moved* or *Stirred*, though not *Broken*, they *Smell* more; As a Sweet-Bagge waved. The *Cause* is double: The one, for that there is a *Greater Emission* of the *Spirit*, when Way is made: And this holdeth in the *Breaking*, *Nipping*, or *Crushing*; It holdeth also, (in some degree) in the Moving: But in this last, there is a Concurrence of the Second *Cause*; Which is the *Impulsion* of the *Aire*, that bringeth the *Sent* faster upon us.

389 The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaves smell* not; As *Violets*, *Roses*, *Wall-flowers*, *Gilly-flowers*, *Pincks*, *Wood-bines*, *Vine-flowers*, *Apple-Bloomes*, *Lime-Tree Bloomes*, *Beane-Bloomes*, &c. The *Cause* is, for that where there is Heat and strength enough in the *Plant*, to make the *Leaves Odorate*, there the *Smell* of the *Flower* is rather Evanide and Weaker, than that of the *Leaves*; As it is in *Rose-Mary-Flowers*, *Lavender-Flowers*, and *Sweet-Briar-Roses*. But where there is lesse Heat, there the *Spirit* of the *Plant*, is disgested and refined, and severed from the Grosser Juyce, in the *Efflorescence*, and not before.

390 Most *Odours* smell best, *Broken* or *Crusht*, as hath beene said; But *Flowers Pressed* or *Beaten*, doe leese the Freshnesse and Sweetnesse of their *Odour*. The *Cause* is, for that when they are *Crushed*, the Grosser and more *Earthy Spirit* commeth out with the Finer, and troubleth it; Whereas in stronger *Odours* there are no such Degrees of the Issue of the *Smell*.

Experiments in Consort, touching the *Goodnesse* and *Choyce* of *Water*.

IT is a Thing of very good Use, to Discover the *Goodnesse* of *Waters*. The *Taste*, to those that Drinke *Water* onely, doth somewhat: But other *Experiments* are more sure. Fitst, try *Waters* by *Weight*; Wherein you may finde some difference, though not much: And the *Lighter* you may account the Better.

391 Secondly, try them by *Boyling* upon an *Equall Fire:* And that which consumeth away fastest, you may account the Best.

392 Thirdly, try them in *Severall Bottles*, or Open Vessels, Matches in every Thing else, and see which of them *Last Longest*, without *Stench*, or *Corruption*. And that which holdeth Unputrified longest, you may likewise account the Best.

393 Fourthly, try them by *Making Drinkes* Stronger, or Smaller, with the same *Quantity* of *Mault*; And you may conclude, that that *Water*, which maketh the *Stronger Drinke*, is the more Concocted, and Nourishing; though perhaps it be not so good for *Medicinall use*. And such *Water* (commonly) is the *Water* of *Large* and *Navigable Rivers:* And likewise in *Large* and *Cleane Ponds* of *Standing Water:* For upon both them, the Sunne hath more power than upon Fountaines, or Small Rivers. And I conceive that *Chalke-Water* is next them the best, for going furthest in *Drinke:* For that also helpeth *Concoction*; So it be out of a *Deepe Well*; For then it Cureth

394 the

the Rawneſſe of the *Water*; But *Chalkie Water*, towards the Top of the Earth, is too fretting; As it appeareth in Laundry of Cloaths, which weare out apace, if you uſe ſuch *Waters*.

Fifthly, the Houſwives doe finde a Difference in *Waters*, for the *Bearing* or *Not Bearing* of *Soape*: And it is likely that the more *Fat Water* will beare *Soape* beſt; For the *Hungry water* doth kill the Unctuous Nature of the *Soape*. 395

Sixthly, you may make a Judgement of *Waters*, according to the *Place*, whence they Spring, or Come: The *Raine-Water* is, by the *Phyſitians* eſteemed the Fineſt, and the beſt; But yet it is ſaid to putrifie ſooneſt; which is likely, becauſe of the Fineneſſe of the Spirit: And in *Conſervatories* of *Raine-water*, (ſuch as they have in *Venice*, &c.) they are found not ſo Choice *Waters*; The worſe, (perhaps,) becauſe they are Covered aloft, and kept from the Sunne. *Snow-water* is held unwholeſome; In ſo much as the People, that dwell at the Foot of the *Snow-Mountaines*, or otherwiſe upon the Aſcent, (eſpecially the Women,) by drinking of *Snow-water*, have great Bagges hanging under their Throats. *Well-water*, except it be upon *Chalke*, or a very plentifull Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *High-Hills* are the beſt: For both they ſeeme to have a Lightneſſe, and Appetite of Mounting; And beſides they are moſt pure and unmingled; And againe, are more Percolated thorow a great ſpace of Earth. For *Waters* in *Valleyes*, joyne in effect under Ground with all *Waters* of the ſame Levell; Whereas *Springs* on the *Tops* of *Hills*, paſſe thorow a great deale of Pure *Earth*, with leſſe Mixture of other *Waters*. 396

Seventhly, Judgement may bee made of *Waters* by the *Soyle whereupon the Water runneth*; As *Pebble* is the Cleaneſt, and beſt taſted; And next to that *Clay-water*; And Thirdly, *Water* upon *Chalke*; Fourthly, that upon *Sand*; And Worſt of all upon *Mudde*. Neither may you truſt *Waters* that *Taſte Sweet*; For they are commonly found in Riſing Grounds of great *Cities*; which muſt needs take in a great deale of Filth. 397

IN *Peru*, and divers Parts of the *Weſt-Indies*, though under the *Line*, the *Heats* are not ſo Intolerable, as they be in *Barbary*, and the Skirts of the *Torrid Zone*. The *Cauſes* are, Firſt, the Great *Brizes*, which the Motion of the Aire in great Circles, (ſuch as are under the *Girdle* of the *World*,) produceth; Which doe refrigerate; And therefore in thoſe Parts Noone is nothing ſo hot, when the *Brizes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another *Cauſe* is, for that the Length of the Night, and the Dewes thereof, doe compenſe the *Heat* of the Day. A third *Cauſe* is the Stay of the Sunne; Not in Reſpect of Day and Night, (for that wee ſpake of before,) but in Reſpect of the Seaſon; For under the *Line*, the Sunne croſſeth the *Line*, and maketh two Summers, and two Winters; But in the Skirts of the *Torrid Zone*, it doubleth, and goeth back againe, and ſo maketh one Long Summer.

Experiment Solitary touching the *Temperate Heat* under the *Æquinoctiall*. 398

THe *Heat* of the *Sunne* maketh *Men Blacke* in ſome Countries, as in *Æthiopia*, and *Ginny*, &c. *Fire* doth it not, as wee ſee in *Glaſſe-Men*, that are continually about the *Fire*. The *Reaſon* may bee, becauſe *Fire* doth lick up the *Spirits*, and Bloud of the Body, ſo as they Exhale; So that it ever maketh *Men* looke Pale and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the Bloud to the Outward *Parts*; And rather Concocteth it, than Soaketh it: And therefore wee ſee that all

Experiment Solitary touching the *Coloration* of *Blacke* and *Tawney Moores*. 399

Æthiopes are Fleshy, and Plumpe, and have great Lips; All which betoken *Moisture* retained, and not drawne out. We see also, that the *Negroes* are bred in Countries that have plenty of *Water*, by *Rivers*, or otherwise: For *Meroë*, which was the *Metropolis* of *Æthiopia*, was upon a great Lake: And *Congo*, where the *Negroes* are, is full of Rivers. And the Confines of the River *Niger*, where the *Negroes* also are, are well watered: And the Region about *Capo Verde*, is likewise Moist, in so much as it is pestilent through Moisture: But the Countries of the *Abyssenes*, and *Barbary*, and *Peru*, where they are Tawney, and Olivaster, and Pale, are generally more Sandy, and Dry. As for the *Æthiopes*, as they are Plumpe, and Fleshy; So (it may be) they are Sanguine, and ruddy Coloured, if their black Skinne would suffer it to be seene.

Experiment Solitary touching *Motion* after the *Instant* of *Death*.

400

SOme *Creatures* doe move a good while after their Head is off; As *Birds*; Some a very little time; As *Men*, and all beasts; Some move, though cut in severall Pieces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. First therefore it is certaine, that the *Immediate Cause* of *Death*, is the Resolution or Extinguishment of the *Spirits*; And that the Destruction or Corruption of the *Organs*, is but the *Mediate Cause*. But some *Organs* are so peremptorily necessary, that the Extinguishment of the Spirits doth speedily follow; But yet so, as there is an *Interim* of a Small Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beast* hath lowed, after the Heart hath beene severed; And it is a Report also of Credit, that the *Head* of a *Pigge* hath beene opened, and the Braine put into the Palme of a Mans hand, trembling, without breaking any part of it, or severing it from the Marrow of the Back-bone; During which time the *Pigge* hath beene, in all appearance, starke dead, and without Motion; And after a small Time the Braine hath beene replaced, and the Skull of the *Pigge* closed, and the *Pigge* hath a little after gone about. And certaine it is, that an *Eye* upon *Revenge* hath been thrust forth, so as it hanged a pretty distance by the *Visuall Nerve*; And during that time the *Eye* hath beene without any Power of *Sight*; And yet after (being replaced) recovered *Sight*. Now the *Spirits* are chiefly in the *Head*, and *Cells* of the *Braine*, which in *Men*, and *Beasts* are Large; And therefore, when the *Head* is off, they move little or nothing. But *Birds* have small *Heads*, and therefore the *Spirits* are a little more dispersed in the *Sinewes*, whereby Motion remaineth in them a little longer; In so much as it is Extant in Story, that an *Emperour* of *Rome*, to shew the Certainty of his Hand, did Shoot a great Forked Arrow at an *Estrich*, as she ran swiftly upon the Stage, and strook off her Head; And yet she continued the Race, a little way, with the Head off. As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffused almost all over; And therefore they move in their Severall Pieces.

NATVRALL HISTORIE.

V. Century.

WEE will now enquire of *Plants* or *Vegetables*: And wee ſhall doe it with diligence. They are the principall Part of the *Third Dayes Worke*. They are the firſt *Producat*, which is the Word of *Animation*: For the other Words are but the Words of *Eſſence*; And they are of excellent and generall Uſe, for Food, Medicine, and a Number of Mechanicall Arts.

Experiment in Conſort, touching the *Acceleration* of *Germination*.

401 There were ſowen in a *Bed*, *Turnip-Seed*, *Radiſh-Seed*, *Wheat*, *Cucumber-Seed*, and *Peaſe*. The *Bed* wee call a *Hot-Bed*, and the Manner of it is this. There was taken *Horſe-dung*, old, and well rotted; This was laid upon a Banke, halfe a foot high, and ſupported round about with Planks; And upon the Top was caſt Sifted Earth, ſome two Fingers deepe; And then the *Seed* ſprinkled upon it, having been ſteeped all night in *Water* Mixed with *Cow-dung*. The *Turnip-Seed*, and the *Wheat* came up halfe an Inch above Ground, within two dayes after, without any Watring. The Reſt the third day. The *Experiment* was made in *October*; And (it may be) in the *Spring*, the *Accelerating* would have been the ſpeedier. This is a Noble *Experiment*; For without this helpe, they would have beene foure times as long in comming up. But there doth not occurre to me, at this preſent, any uſe thereof, for profit; Except it ſhould be for Sowing of *Peaſe*, which have their price very much increaſed, by the early Comming. It may be tried alſo with *Cherries*, *Strawberries*, and other Fruit, which are deareſt, when they come early.

402 There was *Wheat*, ſteeped in *Water* mixed with *Cow-dung*; Other in *Water* mixed with *Horſe-Dung*; Other in *Water* mixed with *Pigeon-Dung*; Other in *Vrine* of *Man*; Other in *Water* mixed with *Chalke* powdred; Other in *Water* mixed with *Soot*; Other in *Water* mixed with *Aſhes*; Other in *Wa-*

ter mixed with *Bay-Salt*; Other in *Claret Wine*; Other in *Malmsey*; Other in *Spirit of Wine*. The Proportion of the Mixture was, a fourth Part of the Ingredients to the *Water*; Save that there was not of the *Salt* above an eighth Part. The *Vrine*, and *Wines*, and *Spirit* of *Wine*, were Simple without Mixture of *Water*. The Time of the Steeping was twelve houres. The Time of the Yeare *October*. There was also other *Wheat* sowen *unsteeped*, but *watred* twice a day with *Warme water*. There was also other *Wheat* sowen *Simple* to compare it with the rest. The Event was; that those that were in the Mixture of *Dung*, and *Vrine*, and *Soot*, *Chalke*, *Ashes*, and *Salt*, came up within sixe dayes: And those that afterwards proved the Highest, Thickest, and most Lustie, were; first the *Vrine*; And then the *Dungs*; Next the *Chalke*; Next the *Soot*; Next the *Ashes*; Next the *Salt*; Next the *Wheat Simple* of it selfe, unsteeped, and unwatered; Next the *Watered twice a day* with warme water; Next the *Claret Wine*. So that these three last were slower than the Ordinary *Wheat* of it selfe; And this Culture did rather retard, than advance. As for those that were steeped in *Malmsey*, and *Spirit* of *Wine*, they came not up at all. This is a Rich *Experiment* for Profit; For the most of the Steepings are Cheape Things; And the goodnesse of the Crop is a great Matter of Gaine; If the Goodnesse of the Crop answer the Earlinesse of the Comming up: As it is like it will; Both being from the Vigour of the *Seed*; Which also partly appeared in the Former *Experiments*, as hath beene said. This *Experiment* would be tried in other *Grains*, *Seeds*, and *Kernells*: For it may be some *Steeping* will agree best with some *Seeds*. It would be tried also with *Roots* steeped as before, but for *longer time*. It would be tried also in *Severall Seasons* of the *Yeare*, especially the *Spring*.

403 *Strawberries* watered now and then, (as once in three dayes,) with *Water*, wherein hath beene steeped *Sheepes-dung*, or *Pigeons-dung*, will prevent and come early. And it is like the same Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Graines*, or *Trees*. And therefore it is an *Experiment*, though vulgar in *Strawberries*, yet not brought into use generally: For it is usuall to helpe the Ground with Mucke; And likewise to Recomfort it sometimes with Muck put to the Roots; But to water it with *Muck water*, which is like to be more Forcible, is not practised.

404 *Dung*, or *Chalke*, or *Bloud*, applied in Substance, (seasonably,) to the Roots of Trees, doth set them forwards. But to doe it unto *Herbs*, without Mixture of *Water* or *Earth*, it may be these helps are too Hot.

405 The former *Meanes* of Helping *Germination*, are either by the *Goodnesse* and *Strength* of the *Nourishment*; Or by the *Comforting*, and *Exciting* the *Spirits* in the *Plant*, to draw the Nourishment better. And of this latter kinde, concerning the *Comforting* of the *Spirits* of the *Plant*, are also the experiments that follow; Though they be not Applications to the *Root*, or *Seed*. The *Planting* of *Trees warme* upon a *Wall*, against the South, or South-East Sunne, doth hasten their Comming on, and Ripening; And the South-East is found to be better than the South-West, though the South-West bee the Hotter Coast. But the cause is chiefly, for that the Heat of the Morning succeedeth the Cold of the Night: and partly, because, (many times) the South-West Sunne is too Parching. So likewise the *Planting* of them upon the *Back* of a *Chimney* where a *Fire* is kept, doth hasten their Comming on, and Ripening: Nay more, the *Drawing* of the *Boughes* into the *Inside* of a *Roome*, where a Fire is continually kept, worketh the same Effect; which hath beene tried with Grapes; In so much as they will come a Moneth earlier, than the Grapes abroad.

Besides

406 Besides the two *Meanes* of *Accelerating Germination*, formerly described; That is to say, the *Mending* of the *Nouriſhment*; *Comforting* of the *Spirit* of the *Plant*; there is a Third; Which is the *Making way* for the *Eaſie Comming* to the *Nouriſhment*, and *Drawing* it. And therefore *Gentle Digging* and *Looſening* of the *Earth* about the *Roots* of *Trees*; And the *Removing Herbes* and *Flowers* into new Earth, once in two yeares, (which is the ſame thing; For the new Earth is ever looſer,) doth greatly further the *Proſpering*, and *Earlineſſe* of *Plants*.

407 But the moſt admirable *Acceleration* by *Facilitating* the *Nouriſhment*, is that of *Water*. For a *Standard* of a *Damaske* Roſe with the *Root* on, was ſet in a Chamber, where no Fire was, upright in an *Earthen Pan*, full of *Faire Water*, without any Mixture, halfe a foot under the *Water*, the *Standard* being more than two Foot high above the *Water*: Within the Space of ten dayes, the *Standard* did put forth a faire Greene leafe, and ſome other little Buds, which ſtood at a ſtay, without any Shew of decay or withering, more than ſeven Dayes. But afterwards that Leafe faded, but the young Buds did ſprout on; which afterward opened into fair Leaves, in the ſpace of three Moneths; And continued ſo a while after, till upon Removall we left the Triall. But note that the *Leaves* were ſomewhat paler, & lighter-colored, than the *Leaves* uſe to be abroad. Note that the firſt *Buds* were in the End of *October*; And it is likely that if it had beene in the *Spring* time, it would have put forth with greater ſtrength, and (it may be) to have growne on to beare Flowers. By this Meanes, you may have, (as it ſeemeth,) *Roſes* ſet in the middeſt of a *Poole*, being ſupported with ſome ſtay; Which is Matter of Rareneſſe and Pleaſure, though of ſmall Uſe. This is the more ſtrange, for that the like *Roſe-ſtandard* was put, at the ſame time, into *Water* mixed with *Horſe-dung*, the Horſe-dung about the fourth Part to the *Water*, and in foure Moneths ſpace (while it was obſerved) put not forth any *Leafe*, though divers *Buds* at the firſt, as the other.

408 A *Dutch Flower*, that had a *Bulbous Root*, was likewiſe put, at the ſame time, all under *Water*, ſome two or three Fingers deep; And within ſeven dayes ſprouted, and continued long after, further Growing. There were alſo put in, a *Beet-Root*, a *Borrage-Root*, and a *Raddiſh-Root*, which had all their *Leaves* cut almoſt cloſe to the *Roots*; And within ſix weekes had faire *Leaves*; And ſo continued, till the end of *November*.

409 Note that if *Roots*, or *Peaſe*, or *Flowers*, may be *Accelerated* in their *Comming* and *Ripening*, there is a double Profit; The one in the high *Price* that thoſe Things beare when they come early: The other in the *Swiftneſſe* of their *Returnes*: For in ſome Grounds which are ſtrong, you ſhall have a *Raddiſh*, &c. come in a Moneth; That in other Grounds will not come in two; And ſo make double *Returnes*.

410 *Wheat* alſo was put into the *Water*, and came not forth at all; So as it ſeemeth there muſt be ſome Strength and Bulke in the Body, put into the *Water*, as it is in *Roots*; For *Graines*, or *Seeds*, the Cold of the *Water* will mortifie. But caſually ſome *Wheat* lay under the Pan, which was ſomewhat moiſtened by the Suing of the Pan; which in ſix weekes (as aforeſaid) looked mouldy to the Eye, but it was ſprouted forth halfe a Fingers length.

411 It ſeemeth by theſe *Inſtances* of *Water*, that for Nouriſhment, the *Water* is almoſt all in all, and that the *Earth* doth but keepe the *Plant* upright, and ſave it from Over-heat, and Over-cold; And therefore is a Comfortable *Experiment* for good *Drinkers*. It proveth alſo that our former *Opinion*; That

Drinke

Drinke incorporate with Fleſh, or Roots, (as in *Capon-Beere*, &c.) will nouriſh more eaſily, than Meat and Drinke taken ſeverally.

412 The *Houſing* of *Plants* (I conceive) will both *Accelerate Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seaſons*: And as we *Houſe Hot Countrey Plants*, as *Limons*, *Orenges*, *Myrtles*, to ſave them; So we may *Houſe* our own *Countrey Plants*, to forward them, and make them come in the Cold Seaſons; In ſuch ſort, that you may have *Violets*, *Strawberries*, *Peaſe*, all Winter: So that you ſow, or remove them at fit times. This *Experiment* is to be referred unto the *Comforting* of the *Spirit* of the *Plant*, by *Warmth*, as well as *Houſing* their *Boughs*, &c. So then the *Meanes*, to *Accelerate Germination*, are in Particular eight, in Generall three.

Experiments in Conſort, touching the *Putting backe* or *Retardation* of *Germination*.

TO make *Roſes*, or other *Flowers* come late, it is an *Experiment* of Pleaſure. For the Ancients eſteemed much of *Roſa Sera*. And indeed the *November-Roſe* is the ſweeteſt, having been leſſe exhaled by the Sunne. The Meanes are theſe. First, the *Cutting off their Tops*, immediately after they

413 have done Bearing; And then they will come againe the ſame yeare about *November*: But they will not come juſt on the Tops, where they were cut, but out of thoſe Shoots, which were (as it were,) *Water-Boughs*. The *Cauſe* is, for that the Sap, which otherwiſe would have fed the Top, (though after Bearing,) will, by the diſcharge of that, divert unto the Side-Sprouts; And they will come to beare, but later.

414 The Second is the *Pulling off the Buds of the Roſe*, when they are *Newly knotted*; For then the Side-Branches will beare. The *Cauſe* is the ſame with the former: For *Cutting off the Tops*, and *Pulling off the Buds* worke the ſame Effect, in Retention of the Sap for a time, and Diverſion of it to the Sprouts, that were not ſo forward.

415 The Third is the *Cutting* off ſome few of the *Top-Boughes* in the *Spring-time*, but ſuffering the lower Boughes to grow on. The *Cauſe* is, for that the Boughes doe helpe to draw up the Sap more ſtrongly; And we ſee that in Powling of Trees, many doe uſe to leave a Bough or two on the Top, to helpe to draw up the Sap. And it is reported alſo, that if you graft upon the Bough of a Tree, and cut off ſome of the old Boughes, the new Cions will periſh.

416 The Fourth is by *Laying the Roots bare about Chriſtmas*, ſome dayes. The *Cauſe* is plaine, for that it doth arreſt the Sap, from going upwards, for a time; Which Arreſt is afterwards releaſed by the Covering of the Root againe with Earth; And then the Sap getteth up, but later.

417 The Fifth is the *Removing* of the *Tree*, ſome Moneth before it *Buddeth*. The *Cauſe* is, for that ſome time will be required after the *Remove*, for the Reſetling, before it can draw the Juyce; And that time being loſt, the Bloſſome muſt needs come forth later.

418 The Sixth is the *Grafting* of *Roſes* in *May*, which commonly Gardiners doe not till *July*; And then they beare not till the Next Yeare; But if you graft them in *May*, they will beare the ſame yeare, but late.

419 The Seventh is, the *Girding* of the *Body* of the *Tree* about with ſome Packthreed; For that alſo in a degree, reſtraineth the Sap, and maketh it come up more late, and more Slowly.

420 The Eighth is, the *Planting* of them in a *Shade*, or in a *Hedge*; The *Cauſe* is, partly the Keeping out of the Sunne, which haſteneth the Sap to riſe; And partly the Robbing of them of Nouriſhment, by the Stuffe in the *Hedge*. Theſe meanes may be practiſed upon other, both Trees, and Flowers, *Mutatis Mutandis*.

Men

421 Men have entertained a Conceit that ſheweth prettily; Namely, that if you graft a *Late-Comming Fruit*, upon a Stocke of a *Fruit-Tree* that *Commeth early*, the Graft will beare *Fruit Early*; As a Peach upon a Cherry; And contrariwiſe, if an *Early-Comming-Fruit* upon a Stock of a *Fruit-Tree* that *Commeth late*, the Graft will beare Fruit late; As a Cherry upon a Peach. But theſe are but Imaginations, and untrue. The *Cauſe* is, for that the Cions overruleth the Stock quite; And the Stock is but Paſſive onely, and giveth Aliment, but no Motion to the Graft.

Experiments in Conſort, touching the *Melioration* of *Fruits*, *Trees*, and *Plants*.

Wee will ſpeake now, how to make *Fruits*, *Flowers*, and *Roots* larger; in more plenty; and ſweeter; than they uſe to be. And how to make the *Trees* themſelves, more Tall; more Spread; and more Haſty and Sudden; than they uſe to bee. Wherein there is no doubt, but the former *Experiments* of *Acceleration*, will ſerve much to theſe Purpoſes. And again, that theſe *Experiments*, which we ſhall now ſet downe, doe ſerve alſo for *Acceleration*; becauſe both Effects proceed from the Encreaſe of vigour in the Tree; But yet to avoid Confuſion; And becauſe ſome of the Means are more proper for the one Effect, and ſome for the other, we will handle them apart.

422 It is an aſſured Experience, that an *Heape* of *Flint*, or *Stone*, laid about the *Bottome* of a *Wilde-Tree*, (as an Oake, Elme, Aſh, &c.) upon the firſt Planting, doth make it proſper double as much, as without it. The *Cauſe* is, for that it retaineth the Moiſture, which falleth at any time upon the *Tree*, and ſuffereth it not to be exhaled by the Sunne. Againe, it keepeth the Tree warme, from Cold Blaſts and Froſts, as it were in an Houſe. It may be alſo, there is ſomewhat in the Keeping of it ſteady at the firſt. *Quære*, if Laying of Straw ſome Height about the Body of a *Tree*, will not make the *Tree* forwards. For though the Root giveth the Sap, yet it is the Body that draweth it. But you muſt note, that if you lay *Stones* about the ſtalke of Lettuce, or other Plants, that are more ſoft, it will over-Moiſten the Roots, ſo as the Wormes will eate them.

423 A *Tree*, at the firſt *Setting*, ſhould not be *Shaken*, untill it hath *taken Root fully*: And therefore ſome have put two little Forkes about the Bottome of their *Trees*, to keep them upright; But after a yeares Rooting, then Shaking doth the *Tree* good, by Looſening of the Earth, and (perhaps) by Exerciſing (as it were) and Stirring the Sap of the *Tree*.

424 Generally, the *Cutting away* of *Boughes* and *Suckers* at the *Root* and *Body*, doth make *Trees* grow high; And contrariwiſe, the *Powling* and *Cutting* of the Top, maketh them grow ſpread, and buſhy. As we ſee in *Pollards*, &c.

425 It is reported, that to make *haſty Growing Coppice-Woods*, the way is, to take *Willow*, *Sallow*, *Poplar*, *Alder*, of ſome ſeven yeares growth; And to ſet them, not upright, but a-ſlope, a reaſonable depth under the Ground; And then, in ſtead of one Root, they will put forth many, and ſo carry more Shoots upon a Stemme.

426 When you would have *many new Roots* of *Fruit-Trees*, take a *Low Tree*, and bow it, and lay all his branches a-flat upon the Ground, and caſt Earth upon them; And every Twigge will take Root. And this is a very profita-

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ble *Experiment* for Coſtly *Trees*; (for the Boughes will make Stockes without charge;) Such as are *Apricots*, *Peaches*, *Almonds*, *Cornelians*, *Mulberries*, *Figs*, &c. The like is continually practiſed with *Vines*, *Roſes*, *Muske-Roſes*, &c.

427 From *May* to *Iuly* you may take off the *Barke* of any *Bough*, being of the Bigneſſe of three or foure Inches, and cover the bare Place, ſomewhat above, and below, with Loame well tempered with Horſe-dung, binding it faſt downe. Then cut off the Bough about *Alhallontide* in the bare Place, and ſet it in the Ground; And it will grow to be a faire *Tree* in one Yeare. The *Cauſe* may be, for that the *Baring* from the *Barke* keepeth the *Sap* from deſcending towards Winter, and ſo holdeth it in the Bough; And it may bee alſo that the Loam and Horſe-dung applyed to the bare place, doe moiſten it, and cheriſh it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping up the Sap of *Trees* in their Boughes; Which may ſerve to other Effects.

428 It hath been practiſed in *Trees*, that ſhew faire, and beare not, to *Bore a Hole* thorow the *Heart* of the *Tree*, and thereupon it will beare. Which may be, for that the *Tree* before had two much *Repletion*, and was oppreſſed with his owne Sap; For *Repletion* is an Enemie to Generation.

429 It hath beene practiſed in *Trees*, that doe not beare, to cleave two or three of the Chiefe Roots, and to put into the Cleft a ſmall Pebble, which may keepe it open, and then it will beare. The *Cauſe* may be, for that a Root of a Tree may be (as it were,) Hide-bound, no leſſe than the Body of the Tree; but it will not keep open without ſomewhat put into it.

430 It is uſually practiſed, to ſet *Trees* that require much *Sunne*, upon *Walls* againſt the *South*; As *Apricots*, *Peaches*, *Plums*, *Vines*, *Figs*, and the like. It hath a double Commoditie; The one, the *Heat* of the *Wall* by *Reflexion*; The other, the *Taking away* of the *Shade*; For when a *Tree* groweth round, the upper Boughes over-ſhadow the lower: But when it is ſpread upon a Wall, the Sunne commeth alike, upon the upper, and lower Branches.

431 It hath alſo been practiſed (by ſome) to pull off ſome *Leaves* from the *Trees* ſo *ſpread*, that the Sunne may come upon the *Bough* and *Fruit* the better. There hath been practiſed alſo a Curioſitie, to ſet a *Tree* upon the *North-Side* of a Wall, and at a little height, to draw him thorow the Wall, and ſpread him upon the *South-Side*: Conceiving that the Root and lower Part of the Stocke ſhould enjoy the Freſhneſſe of the Shade; And the Upper Boughes, and Fruit, the Comfort of the Sunne. But it ſorted not; The *Cauſe* is, for that the *Root* requireth ſome Comfort from the Sunne, though under Earth, as well as the *Bodie*: And the Lower Part of the Bodie more than the Upper, as wee ſee in Compaſſing a *Tree* below with ſtraw.

432 The *Lowneſſe* of the *Bough*, where the *Fruit* commeth, maketh the *Fruit* greater, and to ripen better; For you ſhall ever ſee in *Apricots*, *Peaches*, or *Melo-Cotones*, upon a wall, the greateſt Fruits towards the Bottome. And in *France* the *Grapes* that make the *Wine*, grow upon low Vines, bound to ſmall Stakes. And the raiſed Vines in Arbours make but Verjuyce. It is true, that in *Italy*, and other *Countries*, where they have hotter Sunne, they raiſe them upon *Elmes*, and Trees; But I conceive, that if the *French* Manner of Planting low, were brought in uſe there, their *Wines* would be ſtronger and ſweeter. But it is more chargeable in reſpect of the Props. It were good to trie whether a *Tree* grafted ſomewhat neare the Ground, and the lower boughes onely maintained, and the higher continually proined off, would not make a larger *Fruit*.

To

433 To have *Fruit* in *Greater Plentie*, the way is, to graft, not only upon young *Stocks*, but upon divers *Boughes* of an old *Tree*; for they will beare great Numbers of Fruit; Whereas if you graft but upon one Stocke, the *Tree* can beare but few.

434 The *Digging* yearely about the *Roots* of *Trees*, which is a great meanes, both to the *Acceleration* and *Melioration* of *Fruits*, is practised in nothing but in *Vines*; Which if it were transferred unto other *Trees*, and *Shrubs*, (as *Roses*, &c.) I conceive would advance them likewise.

435 It hath beene knowne, that a *Fruit-Tree* hath beene blown up (almost) by the Roots, and set up againe, and the next yeare bare exceedingly. The *Cause* of this, was nothing but the *Loosening* of the *Earth*, which comforteth any *Tree*, and is fit to be practised, more than it is, in *Fruit-Trees*: For *Trees* cannot be so fitly removed into New Grounds, as *Flowers* and *Herbs* may.

436 To revive an *Old Tree*, the Digging of it about the *Roots*, and Applying new Mould to the Roots, is the Way. We see also that *Draught-Oxen*, put into fresh Pasture, gather new and tender Flesh; And in all Things, better Nourishment than hath been used, doth helpe to renew; Especially, if it be not onely better, but changed, and differing from the former.

437 If an *Herbe* be cut off from the *Roots*, in the beginning of Winter, and then the Earth be trodden and beaten downe hard, with the Foot and Spade, the *Roots* will become of very great Magnitude in Summer. The Reason is, for that the Moisture being forbidden to come up in the Plant, stayeth longer in the Root, and so dilateth it. And *Gardiners* use to tread downe any loose Ground, after they have sowne *Onions*, or *Turnips*, &c.

438 If *Panicum* be laid below, and about the Bottome of a *Root*, it will cause the Root to grow to an Excessive Bigneſse. The *Cause* is, for that being it selfe of a Spungy Substance, it draweth the Moisture of the Earth to it, and so feedeth the Root. This is of greatest use for *Onions*, *Turnips*, *Parsnips*, and *Carrets*.

439 The *Shifting* of *Ground* is a Meanes to better the *Tree*, and Fruit; But with this Caution; That all Things doe prosper best, when they are advanced to the better: Your *Nurserie* of *Stocks* ought to be in a more Barren Ground, than the Ground is whereunto you remove them. So all *Grasiers* preferre their Cattell from meaner Pastures to better. We see also, that Hardneſse in Youth lengthneth Life, becauſe it leaveth a Cherishing to the better, of the Body, in Age: Nay in Exercises, it is good to begin with the hardest, as Dancing in Thicke Shooes, &c.

440 It hath beene observed, that *Hacking* of *Trees* in their *Barke*, both downeright, and acroſse, so as you make them rather in slices, than in continued Hacks, doth great good to *Trees*; And especially delivereth them from being *Hide-bound*, and killeth their Mosse.

441 *Shade* to some *Plants* conduceth to make them large, and prosperous, more than *Sun*; As in *Strawberries*, and *Bayes*, &c. Therefore amongst *Strawberries*, sow here and there some *Borrage Seed*; And you shall finde the *Strawberries* under those Leaves farre more large than their Fellowes. And *Bayes* you must plant to the *North*; Or defend them from the *Sunne* by a Hedge-Row; And when you sow the *Berries*, weed not the *Borders*, for the first halfe yeare; For the *Weed* giveth them *Shade*.

442 To increase the *Crops* of *Plants*, there would be considered, not onely the *Increasing* the *Luſt* of the *Earth*, or of the *Plant*, but the Saving also of that which is spilt. So they have lately made a Triall, to *Sow Wheat*; which nevertheleſse

vertheleſſe hath beene left off, becauſe of the trouble and paines; Yet ſo much is true, that there is much ſaved by the *Setting*, in compariſon of that which is *Sowen*; Both by keeping it from being picked up by Birds; And by Avoiding the Shallow lying of it, whereby much that is ſowen taketh no Root.

443 It is preſcribed by ſome of the *Ancients*, that you take *Small Trees*, upon which *Figs* or other *Fruit* grow, being yet unripe, and cover the *Trees* in the Middle of *Autumne* with dung, untill the Spring; And then take them up in a warme day, and replant them in good Ground; And by that meanes, the former yeares *Tree* will be ripe, as by a new Birth; when other *Trees* of the ſame kinde, doe but bloſſome. But this ſeemeth to have no great Probabilitie.

444 It is reported, that if you take *Nitre*, and mingle it with *Water*, to the thickneſſe of *Honey*, and therewith anoint the *Bud*, after the *Vine* is cut, it will ſprout forth within eight dayes. The *Cauſe* is like to be, (if the *Experiment* be true,) the Opening of the *Bud*, and of the Parts Contiguous, by the Spirit of the *Nitre*; For *Nitre* is (as it were) the Life of *Vegetables*.

445 Take *Seed*, or *Kernells* of *Apples*, *Peares*, *Orenges*; Or a *Peach*, or a *Plum-Stone*, &c. And put them into a *Squill*, (which is like a great *Onion*,) and they will come up much earlier than in the *Earth* it ſelf. This I conceive to be as a Kinde of *Grafting* in the *Root*; For as the Stocke of a Graft yeeldeth better prepared Nouriſhment to the Graft, than the Crude Earth; So the *Squill* doth the like to the *Seed*. And I ſuppoſe the ſame would be done, by *Putting Kernells* into a *Turnip*, or the like; Save that the *Squill* is more Vigorous, and Hot. It may bee tried alſo, with putting *Onion-Seed* into an *Onion-Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

446 The *Pricking* of a *Fruit* in ſeverall places, when it is almoſt at his Bigneſſe, and before it ripeneth, hath beene practiſed with ſucceſſe, to ripen the Fruit more ſuddenly. We ſee the Example of the *Biting* of *Waſpes*, or *Wormes*, upon *Fruit*, whereby it (manifeſtly) ripeneth the ſooner.

447 It is reported, that *Alga Marina* (*Sea-Weed*) put under the *Roots* of *Colworts*, and (perhaps) of other *Plants*, will further their Growth. The vertue (no doubt) hath Relation to *Salt*, which is a great Helpe to Fertilitie.

448 It hath beene practiſed, to cut off the Stalkes of *Cucumbers*, immediately after their *Bearing*, cloſe by the Earth; And then to caſt a pretty Quantity of Earth upon the *Plant* that remaineth, and they will bear the next year Fruit, long before the ordinarie time. The *Cauſe* may be, for that the Sap goeth downe the ſooner, and is not ſpent in the Stalke or Leafe, which remaineth after the Fruit. Where note, that the *Dying*, in the winter, of the *Roots* of *Plants*, that are *Annuall*, ſeemeth to be partly cauſed by the Over-Expence of the Sap into Stalke, and Leaves; which being prevented, they will ſuper-annate, if they ſtand warme.

449 The *Pulling off* many of the *Bloſſomes* from a *Fruit-Tree*, doth make the *Fruit* fairer. The *Cauſe* is manifeſt; For that the Sap hath the leſſe to nouriſh. And it is a Common Experience, that if you doe not pull off ſome *Bloſſomes*, the firſt time a *Tree* bloometh, it will bloſſome it ſelfe to death.

450 It were good to trie, what would be the Effect, if all the *Bloſſomes* were pulled from a *Fruit-Tree*; Or the *Acornes*, and *Cheſnut-buds*, &c. from a *Wilde Tree*, for two yeares together. I ſuppoſe that the *Tree* will either put forth, the third yeare, bigger, and more plentifull *Fruit*; Or elſe, the ſame yeares, larger Leaves, becauſe of the Sap ſtored up.

It

451 It hath been generally received, that a *Plant watered* with *Warme Water*, will come up ſooner and better, than with Cold Water, or with Showers. But our *Experiment* of *Watering Wheat* with *Warme Water* (as hath beene ſaid) ſucceeded not; which may be, becauſe the Triall was too late in the Yeare, *viz.* in the End of *October*. For the Cold then comming upon the *Seed*, after it was made more tender by the Warme Water, might checke it.

452 There is no doubt, but that *Grafting* (for the moſt Part) doth *meliorate* the *Fruit*. The *Cauſe* is manifeſt; For that the Nouriſhment is better prepared in the *Stocke*, than in the *Crude Earth*: But yet note well, that there bee ſome *Trees*, that are ſaid to come up more happily from the *Kernell*, than from the *Graft*; As the *Peach*, and *Melocotone*. The *Cauſe* I ſuppoſe to bee, for that thoſe *Plants* require a Nouriſhment of great Moiſture; And though the Nouriſhment of the *Stocke* be finer, and better prepared, yet it is not ſo moiſt, and plentifull, as the Nouriſhment of the *Earth*. And indeed we ſee thoſe *Fruits* are very Cold *Fruits* in their Nature.

453 It hath beene received, that a Smaller *Peare*, grafted upon a *Stocke* that beareth a greater *Peare*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* upon the *Late Stocke*; And *è controverſo*; which we rejected before: For the *Cions* will governe. Nevertheleſſe it is probable enough, that if you can get a *Cions* to grow upon a *Stocke* of another kinde, that is much moyſter than his own *Stocke*, it may make the *Fruit* Greater, becauſe it will yeeld more plentifull Nouriſhment; Though it is like it will make the *Fruit* Baſer. But generally the *Grafting* is upon a drier *Stock*; As the *Apple* upon a *Crab*; The *Peare* upon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* upon the *Stock* of a *Colewort*, and it will beare a great flaggy *Apple*; The *Kernell* of which, if it be ſet, will bee a *Colewort*, and not an *Apple*. It were good to trie, whether an *Apple-Cions* will proſper, if it be grafted upon a *Sallow*, or upon a *Poplar*, or upon an *Alder*, or upon an *Elme*, or upon an *Horſe-Plumme*, which are the moyſteſt of *Trees*. I have heard that it hath beene tried upon an *Elme*, and ſucceeded.

454 It is manifeſt by Experience, that *Flowers* Removed wax greater, becauſe the Nouriſhment is more eaſily come by, in the looſe Earth. It may bee, that Oft Regrafting of the ſame Cions, may likewiſe make *Fruit* greater; As if you take a *Cions*, and graft it upon a *Stocke* the firſt yeare; And then cut it off, and graft it upon another *Stock* the ſecond yeare; and ſo for a third; Or fourth yeare; And then let it reſt, it will yeeld afterward, when it beareth, the greater *Fruit*.

Of Grafting *there are many* Experiments *worth the Noting, but thoſe we reſerve to a proper Place.*

455 It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth Leaves, have his Top cut off. The *Cauſe* is plaine, for that the Sap hath the leſſe to feed, and the leſſe way to mount: But it may be, the *Figge* will come ſomewhat later, as was formerly touched. The ſame may bee tried likewiſe in other *Trees*.

456 It is reported, that *Mulberries* will be fairer, and the *Trees* more fruitfull, if you bore the *Trunke* of the *Tree* thorow, in ſeverall places, and thruſt into the Places bored, Wedges of ſome Hot *Trees*, as *Turpentine*, *Maſtick-Tree*, *Guaiacum*, *Iuniper*, &c. The *Cauſe* may bee, for that Adventive Heat doth cheare up the Native Juyce of the *Tree*.

457 It is reported, that *Trees* will grow greater, and beare better *Fruit*, if you put *Salt*, or *Lees* of *Wine*, or *Bloud* to the *Root*. The *Cauſe* may be the En-

creasing the Luſt or Spirit of the *Root*; Theſe Things being more forcible, than ordinarie *Compoſts*.

458 It is reported by one of the Ancients, that *Artichoakes* will be leſſe prickly, and more tender, if the *Seeds* have their Tops dulled, or grated off upon a Stone.

459 *Herbs* will be tenderer, and fairer; if you take them out of *Beds*, when they are newly come up, and remove them into *Pots*, with better *Earth*. The Remove from *Bed* to *Bed* was ſpoken of before; But that was in ſeverall yeares; This is upon the ſudden. The *Cauſe* is the ſame with other *Removes*, formerly mentioned.

460 *Coleworts* are reported by one of the *Ancients*, to proſper exceedingly, and to be better taſted, if they be ſometimes watred with *Salt-water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is leſſe Adurent than *Salt*.

461 It is reported, that *Cucumbers* will prove more Tender, and Dainty, if their *Seeds* be *Steeped* (a little) in *Milke*; The *Cauſe* may be, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the groſſer Juyce of the Earth, but onely the finer. The ſame *Experiment* may be made in *Artichoakes*, and other *Seeds*, when you would take away, either their Flaſhineſſe, or Bitterneſſe. They ſpeake alſo, that the like Effect followeth, of *Steeping* in *Water* mixed with *Honey*; But that ſeemeth to me not ſo probable, becauſe *Honey* hath too Quicke a Spirit.

462 It is reported that *Cucumbers* will be leſſe *Watrie*, and more *Melon-like*, if in the Pit where you ſet them, you fill it (halfe way up) with *Chaffe*, or ſmall *Sticks*, and then powre *Earth* upon them; For *Cucumbers*, as it ſeemeth, doe extremely affect Moiſture; And over-drinke themſelves; Which this *Chaffe*, or *Chips*, forbiddeth. Nay, it is further reported, that if when a *Cucumber* is growne, you ſet a Pot of water about five or ſix Inches diſtance from it, it will, in 24. houres, ſhoot ſo much out, as to touch the Pot; Which if it be true, it is an *Experiment* of an higher Nature, than belongeth to this *Title*: For it diſcovereth *Perception* in *Plants*, to move towards that which ſhould help and comfort them, though it be at a diſtance. The ancient Tradition of the *Vine* is farre more ſtrange: It is, that if you ſet a Stake, or Prop, ſome diſtance from it, it will grow that way; Which is farre ſtranger (as is ſaid) than the other: For that *Water* may worke by a *Sympathie* of *Attraction*: But this of the *Stake* ſeemeth to be a Reaſonable Diſcourſe.

463 It hath been touched before, that *Terebration* of *Trees* doth make them proſper better. But it is found alſo, that it maketh the *Fruit* ſweeter, and better. The *Cauſe* is, for that notwithſtanding the *Terebration*, they may receive Aliment ſufficient; And yet no more than they can well turne, and diſgeſt; And withall doe ſweat out the courſeſt and unprofitableſt Juyce; Even as it is in *Living Creatures*, which by Moderate Feeding, and Exerciſe, and Sweat, attaine the ſoundeſt Habite of Body.

464 As *Terebration* doth *Meliorate Fruit*, ſo, upon the like reaſon, doth *Letting* of *Plants Bloud*; As *Pricking Vines*, or other *Trees*, after they be of ſome Growth; And thereby letting forth *Gumme*, or *Teares*; Though this be not to continue, as it is in *Terebration*, but at ſome Seaſons. And it is reported, that by this Artifice, *Bitter Almonds* have beene turned into *Sweet*.

465 The Ancients for the *Dulcorating* of *Fruit*, doe commend *Swines-Dung* above all other *Dung*; Which may bee, becauſe of the Moiſture of that Beaſt, whereby the *Excrement* hath leſſe Acrimony; For we ſee *Swines* and *Pigges* Fleſh is the Moiſteſt of Fleſhes.

It

466 It is observed by some, that all *Herbs* wax sweeter, both in Smell and Taste, if after they be growne up some reasonable time, they be cut, and so you take the later Sprout. The *Cause* may be for that the longer the Juyce stayeth in the Root, and Stalke, the better it concocteth. For one of the Chiefe Causes, why *Graines*, *Seeds*, and *Fruits*, are more Nourishing than *Leaves*, is the length of time, in which they grow to *Maturation*. It were not amisse to keepe backe the Sap of *Herbs*, or the like, by some fit meanes, till the end of Summer; whereby (it may be) they will be more Nourishing.

467 As *Grafting* doth generally advance and *Meliorate Fruits*, above that which they would be, if they were set of *Kernels*, or *Stones*; in regard the *Nourishment* is better concocted; So (no doubt) even in *Grafting*, for the same cause, the Choyce of the *Stocke* doth much; Alwayes provided, that it bee somewhat inferiour to the *Cions*: For otherwise it dulleth it. They commend much the *Grafting* of *Peares*, or *Apples*, upon a *Quince*.

468 Besides the *Meanes* of *Melioration* of *Fruits*, before mentioned, it is set downe as tried, that a *Mixture* of *Bran*, and *Swines-Dung*; Or *Chaffe* and *Swines-Dung*; (especially laid up together for a Moneth to rot,) is a very great Nourisher, and Comforter to a *Fruit-Tree*.

469 It is delivered, that *Onions* wax greater, if they be taken out of the Earth, and laid a drying twenty dayes, and then set againe; And yet more, if the outermost Pill be taken off all over.

470 It is delivered by some, that if one take the *Bough* of a *Low-Fruit-tree*, newly budded, and draw it gently, without hurting it, into an *Earthen* Pot perforate at the bottome to let in the *Plant*, and then cover the *Pot* with Earth, it will yeeld a very large *Fruit*, within the Ground. Which *Experiment* is Nothing but *Potting* of *Plants*, without Removing, and Leaving the *Fruit* in the Earth. The like, (they say,) will be effected, by an Empty *Pot* without Earth in it, put over a *Fruit*, being propped up with a *Stake*, as it hangeth upon the *Tree*; And the better, if some few Pertusions be made in the *Pot*. Wherein, besides the Defending of the *Fruit*, from Extremity of Sunne or Weather, some give a reason, that the *Fruit*, Loving and Coveting the open Aire and Sunne, is invited by those Pertusions, to spread and approch, as neare the open Aire, as it can; And so enlargeth in *Magnitude*.

471 All *Trees*, in *High* and *Sandy Grounds*, are to be set deep; And in *Watry Grounds*, more shallow. And in all *Trees*, when they be removed (especially *Fruit-Trees*) care ought to be taken, that the Sides of the *Trees* be coasted, (*North* and *South*, &c.) as they stood before. The same is said also of *Stone* out of the *Quarry*, to make it more durable; Though that seemeth to have lesse reason; Because the *Stone* lyeth not so neare the Sunne, as the *Tree* groweth.

472 *Timber Trees* in a *Coppice Wood*, doe grow better, than in an *Open Field*; Both because, they offer not to spread so much, but shoot up still in Height; And chiefly because they are defended from too much Sunne and Winde, which doe checke the Growth of all *Fruit*; And so (no doubt) *Fruit-Trees*, or *Vines*, set upon a *Wall*, against the Sunne, betweene Elbowes or Buttresses of Stone, ripen more, than upon a Plain Wall.

473 It is said, that if *Potado Roots*, be set in a *Pot* filled with Earth, and then the *Pot* with Earth be set likewise within the Ground, some two or three Inches, the *Roots* will grow greater, than Ordinary. The *Cause* may be, for that Having Earth enough within the *Pot* to nourish them; And then being stopped by the Bottome of the *Pot* from putting Strings downward, they must needs grow greater in Breadth, and Thicknesse. And it may be,

that all *Seeds* or *Roots*, *Potted*, and so set into the *Earth*, will prosper the better.

474 The *Cutting off* the *Leaves* of *Radish*, or other *Roots*, in the beginning of Winter, before they wither; And Covering againe the *Root*, some thing high with Earth; Will preserve the *Root* all Winter, and make it bigger, in the Spring following, as hath beene partly touched before. So that there is a double Use of this *Cutting off* the *Leaves*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Root* the greater: And so it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by Strengthning the *Root*, it will make the *Fruit* also the greater.

475 It is an *Experiment* of great pleasure, to make the *Leaves* of *Shady Trees*, larger than ordinary. It hath beene tryed (for certaine) that a *Cions* of a *Weech-Elme*, grafted upon the Stocke of an Ordinary *Elme*, will put forth Leaves, almost as broad as the Brimme of ones Hat. And it is very likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that beare no *Fruit*, it will make the greater *Leaves*. It would be tried therefore in *Trees* of that kinde chiefly; As *Birch*, *Asp*, *Willow*; And especially the *Shining Willow*, which they call *Swallow-Taile*, because of the pleasure of the Leafe.

476 The *Barrennesse* of *Trees*, by *Accident*, (besides the *Weakenesse* of the *Soile*, *Seed*, or Root; And the *Injurie* of the *Weather*) commeth either of their *Over-growing* with *Mosse*; Or their being *Hide-bound*; Or their *Planting too deepe*; Or by *Issuing* of the *Sap too much into the Leaves*. For all these there are *Remedies* mentioned before.

Experiments in Consort, touching *Compound Fruits* and *Flowers*.

Wee see that in *Living Creatures*, that have *Male* and *Female*, there is Copulation of severall Kindes; and so *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horse* and the *Asse*; And some other *Compounds*, which we call *Monsters*, though more rare: And it is held, that that *Proverbe*, *Africa semper aliquid Monstri parit*; commeth, for that the Fountains of Waters there, being rare, divers Sorts of Beasts come from severall Parts to drink; And so being refreshed, fall to couple, & many times with severall Kinds. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out; which nevertheless, if it bee possible, is more at command than that of *living Creatures*; For that their Lust requireth a voluntary Motion: wherefore it were One of the most Notable *Experiments* touching *Plants*, to finde it out: For so you may have great Varietie of New *Fruits*, and *Flowers* yet unknowne. *Grafting* doth it not: That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the Power to make a *New Kinde*. For the *Cions* ever over-ruleth the *Stocke*.

477 It hath been set downe by one of the *Ancients*, that if you take two *Twigs* of severall *Fruit Trees*, and flat them on the Sides, and then binde them close together, and set them in the ground, they will come up in one Stocke; But yet they will put forth their severall *Fruits* without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Vnity* of *Continuance*, is easier to procure,

procure, than *Vnitie* of *Species*. It is reported also that *Vines* of *Red* and *White Grapes*, being set in the Ground, and the upper Parts being flatted, and bound close together, will put forth *Grapes* of the severall Colours, upon the same Branch; And *Grape-Stones* of severall Colours within the same *Grape*: But the more, after a yeare or two; The Unity (as it seemeth) growing more Perfect. And this will likewise helpe, if from the first *Vniting*, they be often Watred; For all Moisture helpeth to *Vnion*. And it is prescribed also, to binde the *Bud*, as soone as it commeth forth, as well as the *Stocke*; At the least for a time.

They report, that divers *Seeds*, put into a *Clout*, and laid in Earth well dunged, will put up *Plants Contiguous*; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is said of *Kernels*, put into a *Bottle*, with a Narrow Mouth, filled with Earth. 478

It is reported, that young *Trees* of severall kindes, set contiguous without any binding, and very often Watred, in a *Fruitfull Ground*, with the very Luxury of the *Trees*, will incorporate, and grow together. Which seemeth to me the likeliest Meanes, that hath beene propounded; For that the *Binding* doth hinder the Naturall Swelling of the *Tree*; which, while it is in Motion, doth better *unite*. 479

Experiments in Consort touching the *Sympathy* and *Antipathy* of *Plants*.

There are many Ancient and Received Traditions and Observations, touching the *Sympathy* and *Antipathy* of *Plants*; For that some will thrive best growing neare others; which they impute to *Sympathy*: And some worse; wch they impute to *Antipathy*. But these are Idle & Ignorant Conceits; And forsake the true *Indication* of the *Causes*; As the most Part of *Experiments*, that concerne *Sympathies* and *Antipathies* doe. For as to *Plants*, neither is there any such Secret *Friendship*, or *Hatred*, as they imagine; And if we should be content to call it *Sympathy*, and *Antipathy*, it is utterly mistaken; For their *Sympathy* is an *Antipathy*, and their *Antipathy* is a *Sympathy*: For it is thus; Whersoever one *Plant* draweth such a particular Juyce out of the Earth, as it qualifieth the Earth; So as that Juyce which remaineth is fit for the other Plant, there the Neighbourhood doth good; Because the Nourishments are contrarie, or severall: But where two *Plants* draw (much) the same Juyce, there the Neighbourhood hurteth; For the one deceiveth the other.

First therefore, all *Plants* that doe draw much *Nourishment* from the *Earth*, and so soake the Earth, and exhaust it; hurt all Things that grow by them; As Great *Trees*, (especially *Ashes*,) and such *Trees*, as spread their *Roots*, neare the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently received) to the *Vine* onely; But it is an Enemy to any other *Plant*; Because it draweth strongly the fattest Juyce of the Earth. And if it be true, that the *Vine*, when it creepeth neare the *Colewort*, will turne away; This may be, because there it findeth worse Nourishment; For though the *Root* be where it was, yet (I doubt) the *Plant* will bend as it nourisheth. 480

481 Where *Plants* are of ſeverall Natures, and draw ſeverall Juyces out of the Earth, there (as hath been ſaid) the One ſet by the other helpeth: As it is ſet down by divers of the Ancients, that *Rew* doth proſper much, and becommeth ſtronger, if it bee ſet by a *Figge-Tree*: which (wee conceive) is cauſed, Not by Reaſon of *Friendſhip*, but by *Extraction* of a Contrary Juyce: The one Drawing *Iuyce* fit to reſult Sweet, the other bitter. So they have ſet downe likewiſe, that a *Roſe* ſet by *Garlick* is ſweeter: Which likewiſe may be, becauſe the more Fetide Juyce of the Earth goeth into the *Garlick*; And the more Odorate into the *Roſe*.

482 This wee ſee manifeſtly, that there be certaine *Corne-Flowers*, which come ſeldome or never in other places, unleſſe they be ſet; But onely amongſt Corne: As the *Blew-Bottle*, a kinde of *Yellow Mary-Gold*, *Wilde Poppy*, and *Fumitory*. Neither can this be, by Reaſon of the Culture of the Ground, by Plowing, or Furrowing; As ſome *Herbs*, and *Flowers*, will grow but in *Ditches* new Caſt; For if the *Ground* lie fallow, and unſowne, they will not come: So as it ſhould ſeeme to be the *Corne*, that qualifieth the Earth, and prepareth it for their Growth.

483 This Obſervation, if it holdeth, (as it is very probable,) is of great uſe, for the *Meliorating* of *Taſte* in *Fruits*, and *Eſculent Herbs*; And of the *Sent* of *Flowers*. For I doe not doubt, but if the *Figge-Tree* doe make the *Rew* more ſtrong, and bitter, (as the Ancients have noted,) good ſtore of *Rew* planted about the *Figge-Tree*, will make the *Figge* more ſweet. Now the *Taſtes* that doe moſt offend in *Fruits*, and *Herbs*, and *Roots*, are *Bitter*; *Harriſh*; *Sowre*; And *Watriſh*, or *Flaſhy*. It were good therefore to make the *Trials* following.

484 Take *Wormewood*, or *Rew*, and ſet it neare *Lettuce*, or *Coleflory*, or *Artichoake*; And ſee whether the *Lettuce*, or the *Coleflorie*, &c. become not the ſweeter.

485 Take a *Service-Tree*, or a *Cornelian-tree*, or an *Elder-Tree*, which we know have *Fruits* of harſh and binding Juyce, and ſet them neare a *Vine*, or *Figge-Tree*, and ſee whether the *Grapes*, or *Figges*, will not be the ſweeter.

486 Take *Cucumbers*, or *Pumpions*, and ſet them (here and there) amongſt *Muſk-Melons*, and ſee whether the *Melons* will not be more Winy, and better taſted. Set *Cucumbers* (likewiſe) amongſt *Radiſh*, and ſee whether the *Radiſh* will not be made the more Biting.

487 Take *Sorrell*, and ſet it amongſt *Raſps*, and ſee whether the *Raſps* will not be the ſweeter.

488 Take *Common Briar*, and ſet it amongſt *Violets*, or *Wall-Flowers*, and ſee whether it will not make the *Violets*, or *Wall-Flowers* ſweeter, and leſſe Earthy in their Smell. So ſet *Lettuce*, or *Cucumbers*, amongſt *Roſemary*, or *Bayes*, and ſee whether the *Roſemary*, or *Bayes* will not be the more Odorate, or Aromaticall.

489 Contrariwiſe, you muſt take heed, how you ſet *Herbs* together, that draw much the like Juyce. And therefore I thinke *Roſemary* will leeſe in Sweetneſſe, if it be ſet with *Lavender*, or *Bayes*, or the like. But yet, if you will correct the ſtrength of an Herbe, you ſhall doe well to ſet other like Herbs by him, to take him downe; And if you ſhould ſet *Tanſey* by *Angelica*, it may bee, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you ſhould ſet *Rew* by *Common Wormewood*, it may be, the *Wormewood* would turne to be liker *Roman wormewood*.

490 This *Axiome* is of large extent; And therefore would be ſevered, and refined by *Tryall*. Neither muſt you expect to have a *Groſſe Difference* by this kinde of Culture, but only *Further Perfection*. Triall

Triall would bee also made in *Herbs Poysonous*, and *Purgative*, whose ill Qualitie (perhaps) may be discharged, or attempred, by Setting stronger *Poysons*, or *Purgatives*, by them. 491

It is reported, that the *Shrub* called *Our Ladies Seale*; (which is a Kinde of *Briony*,) and *Coleworts*, set neare together, one or both will die. The *Cause* is, for that they be both great Depredatours of the Earth, and one of them starveth the other. The like is said of a *Reed*, and a *Brake*; Both which are succulent; And therefore the One deceiveth the Other. And the like of *Hemlock* and *Rew*; Both which draw strong Juyces. 492

Some of the Ancients, and likewise divers of the Moderne Writers, that have laboured in *Naturall Magick*, have noted a *Sympathy*, between the *Sunne*, *Moone*, and some Principall *Starres*; And cetaine *Herbs*, and *Plants*. And so they have denominated some *Herbs Solar*, and some *Lunar*; And such like Toyes put into great Words. It is manifest, that there are some *Flowers*, that have *Respect* to the *Sunne*, in two *Kindes*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mary-golds*, *Tulippa's*, *Pimpernell*, and indeed most *Flowers*, doe open or spread their Leaves abroad, when the *Sunne* shineth serene and faire: And againe, (in some part,) close them, or gather them inward, either towards Night, or when the Skie is overcast. Of this there needeth no such Solemne Reason to be assigned; As to say, that they rejoyce at the presence of the Sunne; And mourne at the absence thereof. For it is Nothing else, but a little Loading of the Leaves, and Swelling them at the Bottome, with the Moisture of the Aire; whereas the drie Aire doth extend them: And they make it a Peece of the wonder, that *Garden Clover* will hide the *Stalke*, when the *Sunne* sheweth bright; Which is nothing, but a full Expansion of the leaves. For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Marigolds*; *Wart-wort*; *Mallow Flowers*; and others. The *Cause* is somewhat more Obscure than the former; But I take it to bee no other, but that the Part against which the *Sunne* beateth, waxeth more faint and flaccide in the Stalke; And therby lesse able to support the *Flower*. 493

What a little *Moisture* will doe in *Vegetables*, even though they be dead, and severed from the Earth, appeareth wel in the *Experiment* of *Iuglers*. They take the *Beard* of an *Oate*; which (if you marke it well,) is wreathed at the Bottome, and one smooth entire Straw at the Top. They take onely the Part that is Wreathed, and cut off the other, leaving the *Beard* halfe the Breadth of a Finger in length. Then they make a little *Crosse* of a *Quill*, long-wayes of that Part of the *Quill*, which hath the Pith; And Crosse-wayes of that Peece of the *Quill* without Pith; The whole *Crosse* being the Breadth of a Finger high. Then they pricke the Bottome where the *Pith* is, and thereinto they put the *Oaten-beard*, leaving halfe of it sticking forth of the *Quill*: Then they take a little white Box of wood, to deceive Men, as if somewhat in the Box did worke the Feat: In which, with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Crosse* sinke downe, but to stick. Then likewise by way of Imposture, they make a Question; As, Who is the Faireſt Woman in the Company? Or, Who hath a Glove, or Card? And cause Another to name divers Persons: And upon every Naming, they stick the *Crosse* in the Box, having first put it towards their mouth, as if they charmed it; And the *Crosse* stirreth not; But when they come to the Person that they would take; As they hold the *Crosse* to their Mouth, they touch the *Beard* with the Tip of their Tongue, and wet it; And so stick the *Crosse* in the Box; And then you shall see it turne finely 494

and

and ſoftly, three or foure Turnes; which is cauſed by the untwining of the *Beard* by the Moiſture. You may ſee it more evidently, if you ſticke the Croſſe betweene your fingers, in ſtead of the Box; And therefore you may ſee, that this Motion, which is Effected by ſo little Wet, is ſtronger than the Cloſing or Bending of the Head of a *Marigold*.

495 It is reported by ſome, that the *Herbe* called *Roſa-Solis*, (whereof they make Strong Waters,) will at the Noone-day, when the *Sunne* ſhineth hot and bright, have a great Dew upon it. And therefore, that the right Name is *Ros Solis*: which they impute to a Delight and *Sympathy*, that it hath with the Sunne. Men favour Wonders. It were good firſt to be ſure, that the Dew that is found upon it, be not the Dew of the Morning Preſerved, when the Dew of other *Herbs* is breathed away; for it hath a ſmooth and thick Leafe, that doth not diſcharge the Dew ſo ſoone, as other *Herbs* that are more Spungy and Porous. And it may be Purſlane, or ſome other Herbe, doth the like, and is not marked. But if it be ſo, that it hath more Dew at Noon, than in the Morning, then ſure it ſeemeth to be an Exudation of the *Herbe* it ſelfe. As Plummes ſweat when they are ſet into the Oven: for you will not (I hope) thinke, that it is like *Gedeons Fleece* of *Wooll*, that the *Dew* ſhould fall upon that, and no where elſe.

496 It is certaine, that the *Honey-dews*, are found more upon *Oake-leaves*, than upon *Aſh*, or *Beech*, or the like: But whether any *Cauſe* be, from the *Leafe* it ſelfe, to concoct the Dew; Or whether it be onely, that the *Leafe* is Cloſe and Smooth; (And therefore drinketh not in the Dew, but preſerveth it;) may be doubted. It would be well inquired, whether *Manna* the *Drug*, doth fall but upon certaine *Herbs* or *Leaves* onely. *Flowers* that have deep *Sockets*, doe gather in the Bottome, a kinde of *Honey*; As *Honey-Suckles*; (both the *Woodbine*, and the *Trifoile*;) *Lillies*; and the like. And in them certainly the *Flower* beareth part with the *Dew*.

497 The Experience is, that the *Froth*, which they call *Woodeſare*, (being like a kinde of Spittle,) is found but upon certaine *Herbs*, and thoſe hot Ones; As *Lavender*, *Lavender-cotton*, *Sage*, *Hyſſope*, &c. Of the *Cauſe* of this enquire further; For it ſeemeth a Secret. There falleth alſo *Mildew* upon *Corne*, and ſmutteth it; But it may be, that the ſame falleth alſo upon other *Herbs*, and is not obſerved.

498 It were good, Triall were made, whether the great Conſent betweene *Plants* and *Water*, which is a principall Nouriſhment of them, will make an *Attraction* or Diſtance, and not at Touch onely. Therefore take a *Veſſell*, and in the middle of it make a falſe Bottome of courſe Canvaſſe: Fill it with Earth above the Canvaſſe, and let not the Earth be watred; Then ſow ſome good *Seeds* in that Earth; But under the Canvaſſe, ſome halfe a foot in the Bottome of the Veſſell, lay a great *Spunge*, thorowly wet in water; And let it lye ſo ſome ten Dayes; And ſee whether the *Seeds* will ſprout, and the *Earth* become more Moiſt, and the *Spunge* more drie. The *Experiment* formerly mentioned of the *Cucumber*, creeping to the Pot of Water, is farre ſtranger than this.

Experiments in Conſort, touching the *Making Herbs* and *Fruits Medicinable*.

499 THe *Altering* of the *Sent*, *Colour*, or *Taſte* of *Fruit*, by *Infuſing*, *Mixing*, or *Letting* into the *Barke*, or *Root* of the *Tree*, *Herbe*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Subſtance; are but *Fancies*. The *Cauſe* is, for that thoſe Things have paſſed their Period, and nouriſh not. And all *Alteration* of Vegetables, in thoſe Qualities, muſt be by ſomewhat, that is apt to go into the Nouriſhment of the *Plant*. But this is true; that where *Kine* feed upon

Wilde

Wilde Garlicke, their *Milke* tasteth plainely of the *Garlicke:* And the Flesh of *Muttons* is better tasted where the *Sheepe* feed upon *Wilde Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the Curing of the *Scirrus* of the *Liver*, by *Milke* of a *Cow*, that feedeth upon certaine *Herbs*; And *Honey* in *Spaine* smelleth (apparently) of the *Rosemary*, or *Orenge*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Maiden* that was fed with *Napellus*; (which is counted the Strongest poyson of all *Vegetables*; which with use did not hurt the *Maid*, but poisoned some that had Carnall Company with her. So it is observed by some, that there is a vertuous *Bezoar*, and another without vertue; which appeare to the shew alike; But the Vertuous is taken from the Beast, that feedeth upon the Mountaines, where there are *Theriacall Herbs*; And that without Vertue, from those that feed in the Valleys, where no such *Herbs* are. Thus farre I am of Opinion; That as Steeped Wines and Beeres, are very *Medicinall*; And likewise Bread tempred with divers Powders; Soof *Meat* also, (as *Flesh*, *Fish*, *Milke*, and *Egges*,) that they may be made of great use for *Medicine*, and *Diet*, if the *Beast*, *Foule*, or *Fish*, be fed with a speciall kinde of food, fit for the Disease. It were a dangerous Thing also for secret Empoysonments. But whether it may be applyed unto *Plants*, and *Herbs*, I doubt more; Because the Nourishment of them is a more common Juyce; which is hardly capable of any speciall Qualitie, untill the *Plant* doe assimilate it.

But least our Incredulitie may prejudice any profitable Operations in this kinde, (especially since Many of the Ancients have set them downe,) Wee thinke good briefly to propound the foure *Meanes*, which they have devised of Making *Plants Medicinable*. The First is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it up againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the Earth; And so the Nourishment is the more Common, and lesse Qualified: And besides, it is a long time in Going up, ere it come to the *Fruit*. The Second Way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine:* Which is somewhat better: For if any Vertue be received from the *Medicine*, it hath the lesse way, and the lesse time to goe up. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquour*, wherein the *Medicine* is *Infused:* Which I have little Opinion of, because the *Seed*, (I doubt,) will not draw the Parts of the *Matter*, which have the *Propriety:* But it will be farre the more likely, if you mingle the *Medicine* with *Dung*; For that the *Seed* naturally drawing the *Moisture* of the *Dung*, may call in withall some of the *Propriety*. The fourth is, the *Watering* of the *Plant oft*, with an *Infusion* of the *Medicine*. This, in one respect may have more force than the rest; Because the *Medicaton* is oft renewed; Whereas the rest are applyed but at one time: And therefore the Vertue may the sooner vanish. But still I doubt, that the *Root* is somewhat too stubborne to receive those fine *Impressions*; And besides, (as I said before,) they have a great *Hill* to goe up. I judge therfore the likeliest way to be the *Perforation* of the *Body* of the *Tree*, in *severall places, one above the other*;

And the *Filling* of the *Holes* with *Dung mingled with the Medicine*.

And the *Watring* of those *Lumps* of *Dung*, with Squirts of an *Infusion* of the *Medicine* in *Dunged Water*, once in three or foure Dayes.

500

NATU-

NATVRALL HISTORIE.

VI. Century.

OUR *Experiments* wee take care to bee, (as wee have often ſaid,) either *Experimenta Fructifera*, or *Lucifera*; Either of *Vſe*, or of *Diſcovery*: For wee hate *Impoſtures*; And deſpiſe *Curioſities*. Yet becauſe wee muſt apply our Selves ſomewhat to Others, we will ſet down ſome *Curioſities* touching *Plants*.

Experiments in Conſort touching *Curioſities* about *Fruits* and *Plants*.

501 It is a *Curioſitie*, to have *ſeverall Fruits* upon *one Tree*; And the more, when ſome of them come *Earely*, and ſome come *Late*; So that you may have, upon the ſame *Tree*, Ripe *Fruits* all Sommer. This is eaſily done, by Grafting of ſeverall *Crons*, upon ſeverall Boughes, of a Stock, in a good Ground, plentifully fed. So you may have all Kindes of *Cherries*, and all kindes of *Plums*, and *Peaches*, and *Apricots*, upon one *Tree*; But I conceive the *Diverſitie* of *Fruits* muſt be ſuch, as will graft upon the ſame Stock. And therefore I doubt, whether you can have *Apples*, or *Peares*, or *Orenges*, upon the ſame Stocke, upon which you graft *Plums*.

502 It is a *Curioſity* to have *Fruits* of *Divers Shapes*, and *Figures*. This is eaſily performed by Moulding them, when the *Fruit* is young, with Moulds of Earth, or Wood. So you may have *Cucumbers*, &c. as Long as a Cane; Or as round as a Spheare; Or formed like a Croſſe. You may have alſo *Apples*, in the forme of *Peares*, or *Limons*. You may have alſo *Fruit* in more Accurate Figures; As we ſaid of *Men*, *Beaſts*, or *Birds*, according as you make the Moulds. Wherein you muſt underſtand, that you make the Mould big enough, to containe the whole *Fruit*, when it is growne to the greateſt: For elſe you will choake the Spreading of the *Fruit*; Which otherwiſe would ſpread it ſelfe, and fill the Concave, and ſo be turned into the *Shape* deſired; As it is in Mould workes of Liquid things. Some doubt may be conceived,

ceived, that the Keeping of the Sunne from the *Fruit*, may hurt it: But there is ordinary experience of *Fruit* that groweth Covered. *Quære* alſo, whether ſome ſmall Holes, may not be made in the Wood, to let in the Sunne. And note, that it were beſt to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the *Fruit*.

503 It is a *Curioſity*, to have *Inſcriptions*, or *Engravings*, in *Fruit*, or *Trees*. This is eaſily performed, by *Writing* with a *Needle*, or *Bodkin*, or *Knife*, or the like, when the *Fruit*, or *Trees* are young; For as they grow, ſo the Letters will grow more large, and Graphicall.

——*Teneriſque meos incidere Amores*
Arboribus, creſcent illæ, creſcetis Amores.

504 You may have *Trees apparelled* with *Flowers*, or *Herbs*, by *Boring Holes* in the *Bodies* of them, and Putting into them *Earth holpen* with *Mucke*, and *Setting Seeds*, or *Slips*, of *Violets*, *Strawberries*, *Wilde-Thyme*, *Camomill*, and ſuch like in the *Earth*. Wherein they doe but grow, in the *Tree*, as they doe in *Pots*; Though (perhaps) with ſome Feeding from the *Trees*. It would bee tried alſo with *Shoots* of *Vines*, and *Roots* of *Red-Roſes*; For it may be, they being of a more Ligneous Nature, will incorporate with the *Tree* it ſelfe.

505 It is an ordinary *Curioſity*, to *Forme Trees* and *Shrubs*, (as *Roſemary*, *Iuniper*, and the like,) into *Sundry Shapes*; which is done by Moulding them within, and Cutting them without. But they are but lame Things, being too ſmall to keepe Figure: Great *Caſtles* made of *Trees* upon Frames of Timber, with Turrets, and Arches, were anciently matters of Magnificence.

506 Amongſt *Curioſities*, I ſhall place *Colouration*, though it be ſomewhat better: For *Beauty* in *Flowers* is their Preheminence. It is obſerved by ſome, that *Gilly-Flowers*, *Sweet-Williams*, *Violets*, that are *Coloured*, if they be neglected, and neither Watered, nor New Moulded, nor Tranſplanted, will turne *White*. And it is probable, that the *White* with much culture, may turne *Coloured*. For this is certaine, that the *White Colour* commeth of Scarcity of Nouriſhment; Except in Flowers that are onely *White*, and admit no other *Colours*.

507 It is good therefore, to ſee what *Natures* doe accompany what *Colours*; For by that you ſhall have Light, how to induce *Colours*, by Producing thoſe *Natures*. *Whites* are more Inodorate, (for the moſt part,) than *Flowers* of the ſame kinde *Coloured*; As is found in *Single White Violets*, *White-Roſes*, *White Gilly-Flowers*, *White Stock-Gilly-Flowers*, &c. We finde alſo, that *Bloſſomes* of *Trees*, that are *White*, are commonly Inodorate, As *Cherries*, *Peares*, *Plums*; Whereas thoſe of *Apples*, *Crabs*, *Almonds*, and *Peaches*, are Bluſhy, and Smell ſweet. The *Cauſe* is, For that the Subſtance that Maketh the *Flower*, is of the thinneſt and fineſt of the *Plant*; Which alſo maketh *Flowers* to be of ſo dainty *Colours*. And if it be too Sparing, and Thinne, it attaineth no Strength of Odour; Except it be in ſuch *Plants*, as are very Succulent; Whereby they need rather to be ſcanted in their Nouriſhment, than repleniſhed, to have them ſweet. As wee ſee in *White Satyrion*, which is of a Dainty Smell; And in *Beane-Flowers*, &c. And againe, if the *Plant* be of Nature, to put forth *White Flowers* onely, and thoſe not thinne, or drie, they are commonly of rancke and fulſome Smell; As *May-Flowers*, and *White Lillies*.

508 Contrariwiſe, in *Berries*, the *White* is commonly more Delicate, and Sweet in Taſte, than the *Coloured*; As wee ſee in *White Grapes*; In *White Raſpes*; In *White Strawberries*; In *White Currans*, &c. The *Cauſe* is, for that the

the *Coloured* are more juyced, and courser jnyced; And therefore not so well and equally Concocted; But the *White* are better proportioned, to the Disgestion of the *Plant*.

But in *Fruits*, the *White* commonly is meaner; As in *Peare-Plums*, *Damasins*, &c. And the Choicest *Plummes* are Blacke; The *Mulberrie*, (which though they call it a *Berry*, is a *Fruit*,) is better the *Blacke*, than the *White*. The *Harvest White-Plumme*, is a base *Plumme*; And the *Verdoccio* and *White Date-Plumme*, are no very good *Plummes*. The *Cause* is, for that they are all Over-watry: Whereas an higher Concoction is required for Sweetnesse, or Pleasure of Taste; And therefore all your dainty *Plummes*, are a little drie, and come from the Stone; As the *Muskle-Plumme*, the *Damasin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to be *Blacke*, are of the Nature of *Berries*, sweetest such as are Paler; As the *Cœur-Cherry*, which inclineth more to *White*, is sweeter than the *Red*; But the *Egriot* is more sowre. 509

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*: (As of the *Clove-Gilly-Flower*, which is the most Common;) And sow it; And there will come up *Gilly-Flowers*, some of one *Colour*, and some of another, casually, as the *Seed* meeteth with Nourishment in the Earth; So that the *Gardiners* finde, that they may have two or three *Roots* amongst an hundred, that are rare, and of great Price; As *Purple*, *Carnation* of severall *Stripes*; The *Cause* is, (no doubt,) that in *Earth*, though it be contiguous, and in one Bed, there are very severall *Iuyces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which do come up *Purple*, doe alwayes come up Single; The *Iuyce*, as it seemeth, not being able to suffice a *Succulent Colour*, and a *Double Leafe*. This *Experiment* of severall *Colours*, comming up from one *Seed*, would bee tried also in *Larkes-Foot*, *Monkes-Hood*, *Poppey*, and *Hollyoke*. 510

Few *Fruits* are coloured *Red* within; The *Queene-Apple* is; And another *Apple*, called the *Rose-Apple*; *Mulberries* likewise; and *Grapes*, though most toward the Skinne. There is a *Peach* also, that hath a Circle of *Red* towards the Stone: And the *Egriot-Cherry* is somewhat *Red* within; But no *Peare*, nor *Warden*, nor *Plumme*, nor *Apricot*, although they have (many times) *Red* sides, are Coloured *Red* within. The *Cause* may be enquired. 511

The generall *Colour* of *Plants* is *Greene*; which is a *Colour* that no *Flower* is of. There is a *Greenish Prime-Rose*, but it is *Pale*, and scarce a *Greene*; The *Leaves* of some *Trees* turne a little *Murry*, or *Reddish*; And they bee commonly *Young Leaves* that doe so; As it is in *Oakes*, and *Vines*, and *Hasle*. *Leaves* rot into a *Yellow*; And some *Hollies* have part of their *Leaves Yellow*, that are, (to all seeming,) as Fresh and Shining, as the *Greene*. I suppose also, that *Yellow* is a lesse Succulent *Colour*, than *Greene*; And a degree nearer *White*. For it hath beene noted, that those *Yellow Leaves* of *Holly* stand ever towards the *North*, or *North-East*. Some *Roots* are *Yellow*, as *Carrets*; And some *Plants Bloud-Red*, Stalke and Leafe, and all; As *Amaranthus*. Some *Herbes* incline to *Purple*, and *Red*; As a Kinde of *Sage* doth, and a Kinde of *Mint*, and *Rosa Solis*, &c. And some have *White Leaves*, as another Kinde of *Sage*, and another Kinde of *Mint*; But *Azure* and a *Faire Purple*, are never found in *Leaves*. This sheweth that *Flowers* are made of a refined Juyce, of the Earth; And so are *Fruits*: But *Leaves* of a more Course, and Common. 512

It is a *Curiosity* also to make *Flowers Double*; Which is effected by *often Removing* them into *New Earth*; As on the contrary Part, *Double Flowers*, 513

by neglecting, and not Removing, prove *Single*. And the Way to doe it speedily, is to sow or set *Seeds*, or *Slips* of *Flowers*; And as soone as they come up, to remove them into new Ground, that is good. Enquire also, whether *Inoculating* of *Flowers*, (as *Stock-Gilly-Flowers*, *Roses*, *Musk-Roses*, &c. doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Blossomes*: But that *Tree* beareth no *Fruit*; And, it may be, that the same Meanes, which applyed to the *Tree*, doth extremely accelerate the Sap to rise, and Breake forth; Would make the *Tree* spend it selfe in *Flowers*, and those to become *Double*; Which were a great pleasure to see; Especially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that have *Blossomes Blush-Coloured*.

514 The *Making* of *Fruits* without *Core* or *Stone*, is likewise a *Curiositie*; And somewhat better: Because whatsoever maketh them so, is like to make them more Tender and Delicate. If a *Cions* or *Shoot*, fit to be set in the Ground, have the *Pith* finely taken forth, (and not altogether, but some of it left, the better to save the life, it will beare a *Fruit* with little, or no *Core*, or *Stone*. And the like is said to be, of dividing a *Quick-Tree* downe to the Ground, and Taking out the *Pith*, and then binding it up againe.

515 It is reported also, that a *Citron* grafted upon a *Quince*, will have small or no *Seeds*; And it is very probable, that any *Sowre-Fruit* grafted upon a *Stocke*, that beareth a *Sweeter Fruit* may both make the *Fruit* sweeter, and more void of the harsh Matter of *Kernels*, or *Seeds*.

516 It is reported, that not onely the *Taking out* of the *Pith*, but the *Stopping* of the *Iuyce* of the *Pith*, from Rising in the Middest, and *Turning* it to rise on the Outside, will make the *Fruit* without *Core*, or *Stone*; As if you should boare a *Tree* cleane thorow, and put a wedge in. It is true, there is some Affinitie betweene the *Pith* and the *Kernell*, because they are both of a harsh Substance, and both placed in the Middest.

517 It is reported that *Trees watred* perpetually with *Warme Water*, will make a *Fruit*, with little or no *Core* or *Stone*. And the Rule is generall, that whatsoever will make a *Wilde-Tree*, a *Garden-Tree*, will make a *Garden-Tree* to have lesse *Core*, or *Stone*.

Experiments in Consort, touching the *Degenerating* of *Plants*; And of the *Transmutation* of them, one into another.

THe Rule is certaine, that *Plants* for want of Culture, *degenerate* to be baser in the same Kinde; And sometimes so farre, as to change into another Kinde. 1. The *Standing long*, and not being *Removed*, maketh them *degenerate*. 2. *Drought*, unlesse the Earth of it selfe bee moist, doth the like. 3. So doth *Removing into worse Earth*, or *Forbearing to compost the Earth*; As wee see that *Water-Mint* turneth into *Field Mint*; And the *Colewort* into *Rape* by Neglect, &c.

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519 Whatsoever *Fruit* useth to be set upon a *Root*, or a *Slip*, if it be *sowne*, will *degenerate*. *Grapes sowne*, *Figs*, *Almonds*, *Pomgranate Kernels sowne*; make the *Fruits degenerate*, and become Wilde. And againe, Most of those *Fruits* that use to be *grafted*, if they be set of *Kernels*, or *Stones*, *degenerate*. It is true, that *Peaches*, (as hath beene touched before,) doe better upon *Stones Set*, than upon *Grafting*: And the Rule of Exception should seeme to be this; That whatsoever *Plant* requireth much Moisture, prospereth better upon the *Stone*, or *Kernell*, than upon the *Graft*. For the Stocke, though it giveth a finer Nourishment, yet it giveth a scanter, than the Earth at large.

520 *Seeds*, if they bee very *Old*, and yet have strength enough to bring forth a *Plant*, make the *Plant degenerate*. And therefore skilfull Gardiners make triall of the *Seeds*, before they buy them, whether they be good or no, by Putting them

them into Water gently Boyled; And if they bee good, they will ſprout within halfe an Houre.

521 It is ſtrange which is reported, that *Baſill* too much expoſed to the *Sunne*, doth turne into *Wilde Time:* Although thoſe two *Herbs* ſeeme to have ſmall Affinity; but *Baſill* is almoſt the onely Hot *Herbe*, that hath Fat and Succulent *Leaves*; Which Oylineſſe, if it be drawne forth by the Sunne, it is like it will make a very great Change.

522 There is an old Tradition, that *Boughs of Oake*, put into the Earth, will put forth *Wilde Vines:* Which if it be true, (no doubt,) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* Putrifying, qualifieth the Earth, to put forth a *Vine* of it ſelfe.

523 It is not impoſſible, and I have heard it verified, that upon *Cutting downe* of an Old *Timber-Tree*, the *Stub* hath put out ſometimes a *Tree* of another Kinde; As that *Beech* hath put forth *Birch*; Which, if it be true, the *Cauſe* may be, for that the old *Stub* is too ſcant of Juyce, to put forth the former *Tree*; And therefore putteth forth a *Tree* of a ſmaller kinde, that needeth leſſe Nouriſhment.

524 There is an Opinion in the Countrey, that if the ſame *Ground* be *oft ſowen*, with the *Graine* that *grew upon it*, it will, in the end, grow to bee of a baſer kinde.

525 It is certaine, that in very *Sterile Yeares*, *Corne ſowne* will grow to an *Other Kinde*.

Grandia ſæpè quibus mandavimus Hordea Sulcis,
Infœlix Lolium, & ſteriles dominantur Avenæ.

And generally it is a Rule, that *Plants* that are brought forth by *Culture*, as *Corne*, will ſooner change into other *Species*, than thoſe that come of themſelves: For that *Culture* giveth but an Adventitious Nature, which is more eaſily put off.

This worke of the *Tranſmutation* of *Plants*, one into another, is *inter Magnalia Naturæ:* For the *Tranſmutation* of *Species* is, in the vulgar philoſophy, pronounced Impoſſible: And certainly it is a thing of difficultie, and requireth deep Search into Nature: But ſeeing there appeare ſome manifeſt *Inſtances* of it, the Opinion of Impoſſibilitie is to bee rejected; And the Meanes thereof to be found out. Wee ſee, that in *Living Creatures*, that come of *Putrefaction*, there is much *Tranſmutation*, of one into another; As *Caterpillers* turne into *Flies*, &c. And it ſhould ſeeme probable, that whatſoever *Creature*, having life, is generated without *Seed*, that *Creature* will change out of one *Species* into another. For it is the *Seed*, and the Nature of it, which locketh and boundeth in the *Creature*, that it doth not expatiate. So as we may well conclude, that ſeeing the Earth, of it ſelfe, doth put forth *Plants*, without *Seed*, therefore *Plants* may well have a *Tranſmigration* of *Species*. Wherefore wanting *Inſtances*, which doe occurre, wee ſhall give Directions of the moſt likely *Tryalls*: And generally, we would not have thoſe, that

that read this Worke of *Sylva Sylvarum*, account it ſtrange, or thinke that it is an Over-Haſte, that we have ſet downe Particulars untried; For contrariwiſe, in our owne Eſtimation, wee account ſuch Particulars, more worthy, than thoſe that are already tried and knowne. For theſe Later muſt be taken as you finde them; But the Other doe levell Point blank at the *Inventing* of *Cauſes*, and *Axiomes*.

526 First, therefore you muſt make account, that if you will have one *Plant* change into another, you muſt have the *Nouriſhment* over-rule the *Seed*: And therefore you are to practiſe it by *Nouriſhments* as contrary, as may bee, to the *Nature* of the *Herbe*; So nevertheleſſe as the *Herb* may grow; And likewiſe with *Seeds* that are of the Weakeſt Sort, and have leaſt Vigour. You ſhall doe well therefore, to take *Marſh-Herbs*, and Plant them upon Tops of Hills, and Champaignes; And ſuch *Plants* as require much Moiſture, upon Sandie and very drie Grounds. As for Example, *Marſh-Mallowes*, and *Sedge*, upon Hills; *Cucumber* and *Lettuce-Seeds*, and *Coleworts*, upon a *Sandy Plot*: So contrariwiſe plant *Buſhes*, *Heath*, *Ling*, & *Brakes*, upon a *Wet* or *Marſh Ground*. This I conceive alſo, that all *Eſculent* and *Garden-Herbs*, ſet upon the Tops of Hills, will prove more *Medicinall*, though leſſe *Eſculent*, than they were before. And it may be likewiſe, ſome *Wilde Herbs* you may make *Sallet-Herbs*. This is the firſt Rule for *Tranſmutation* of *Plants*.

527 The ſecond Rule ſhall bee to bury ſome few *Seeds*, of the *Herb* you would change, amongſt other *Seeds*; And then you ſhall ſee, whether the Juyce of thoſe other *Seeds*, doe not ſo qualifie the Earth, as it will alter the *Seed*, whereupon you worke. As for Example; Put *Parſly-Seed* amongſt *Onion-Seed*; Or *Lettuce-Seed* amongſt *Parſley-Seed*; Or *Baſill-Seed* amongſt *Thyme-Seed*; And ſee the Change of Taſte, or otherwiſe. But you ſhall doe well, to put the *Seed* you would change, into a little linnen Cloth, that it

528 mingle not with the forraine *Seed*.

The third Rule ſhall be, the *Making* of ſome *Medley* or *Mixture* of *Earth*, with ſome other *Plants Bruiſed*, or *Shaven*, either in *Leafe* or *Root*: As for Example, make *Earth* with a *Mixture* of *Colewort-Leaves* ſtamped, and ſet in it *Artichoakes*, or *Parſnips*; So take *Earth* made with *Marjoram*, or *Origanum*, or *Wilde-Thyme*, bruiſed, or ſtamped, and ſet in it *Fennell-Seed*, &c. In which Operation, the Proceſſe of Nature ſtill will be, (as I conceive,) not that the *Herbe* you worke upon, ſhould draw the Juyce of the Forrain *Herbe*; (For that Opinion we have formerly rejected;) But that there will bee a New Confection of Mould, which perhaps will alter the *Seed*, and yet not to the

529 kinde of the former *Herbe*.

The fourth Rule ſhall be, to marke what *Herbs*, *ſome Earths doe put forth of themſelves*; And to take that *Earth*, and to *Pot* it, or to *Veſſell* it; And in that to ſet the *Seed* you would change: As for Example, take from under Walls, or the like, where *Nettles* put forth in abundance, the Earth which you ſhall there finde, without any *String*, or *Root* of the *Nettles*; And Pot that *Earth*, and ſet in it *Stock-gilly-flowers*, or *Wall-Flowers*, &c. Or ſow in the *Seeds* of them; And ſee what the Event will bee: Or take *Earth*, that you have prepared to put forth *Muſhromes*, of it ſelfe, (whereof you ſhall finde ſome *Inſtances* following;) And ſow in it *Purſlane-Seed*, or *Lettuce-Seed*; for in theſe *Experiments*, it is likely enough, that the *Earth* being accuſtomed to ſend forth one Kinde of Nouriſhment, will alter the new

Seed. The

The fifth Rule shall be, to make the *Herbe grow Contrary to his Nature*; As to make *Ground-Herbs* rise in *Height*: As for example; Carry *Camomill*, or *Wilde-Thyme*, or the *Greene-Strawberry*, upon Sticks, as you doe *Hops* upon Poles; And see what the Event will be. 530

The sixth Rule shall be, to make *Plants grow out of the Sunne, or open Aire*; For that is a great Mutation in Nature; And may induce a Change in the *Seed*: As barrell up *Earth*, and sow some *Seed* in it, and put in the Bottome of a Pond; Or put it in some great hollow *Tree*; Trie also the Sowing of *Seeds*, in the Bottomes of Caves; And Pots with *Seeds* sowne, hanged up in Wells, some distance from the Water, and see what the Event will be. 531

Experiments in Consort, touching the *Procerity*, and *Lowneſſe*, and *Artificiall dwarfing* of *Trees*.

IT is certaine, that *Timber-Trees* in *Coppice-Woods*, grow more upright, and more free from Under-Boughs, than those that stand in the *Field*: The *Cause* whereof is, for that *Plants* have a Naturall Motion, to get to the Sunne; And besides, they are not glutted with too much Nourishment; For that the *Coppice* shareth with them; And Repletion ever hindereth Stature; Lastly, they are kept warme; And that ever in *Plants* helpeth Mounting. 532

Trees, that are, of themselves, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gums*,) as *Firrs*, and *Pines*, mount of themselves in Heighth without Side-Boughs, till they come towards the Top. The *Cause* is, partly Heat; And partly Tenuity of Juyce; Both which send the Sap upwards. As for *Iuniper*, it is but a *Shrub*, and groweth not bigge enough in Body, to maintaine a tall *Tree*. 533

It is reported, that a Good Strong *Canvas*, spread over a *Tree* grafted low, soone after it putteth forth, will *dwarfe* it, and make it spread. The *Cause* is plaine; For that all Things that grow, will grow as they finde Roome.

Trees are generally set of *Roots*, or *Kernells*; But if you set them of *Slips*, (as of some *Trees* you may, by name the *Mulberry*,) some of the *Slips* will take; And those that take, (as is reported,) will be *Dwarfe-Trees*. The *Cause* is, for that a *Slip* draweth Nourishment more weakly, than either a *Root*, or *Kernell*. 535

All *Plants* that put forth their *Sap* hastily, have their Bodies not proportionable to their Length; And therefore they are *Winders*, and *Creepers*; As *Ivy*, *Briony*, *Hops*, *Woodbine*: Whereas *Dwarfing* requireth a slow Putting forth, and lesse Vigour of Mounting. 536

Experiments in Consort, touching the Rudiments of *Plants*, and of the Excrescences of *Plants*, or *Super-Plants*.

The *Scripture* saith, that *Salomon* wrote a *Naturall History*: from the *Cedar* of *Libanus*, to the *Mosse growing upon the Wall*: For so the best *Translations* have it. And it is true that *Mosse* is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, or *Barke*.

Mosse groweth chiefly upon *Ridges* of *Houses*, tiled or thatched; And upon the *Crests* of *Walls*. And that *Mosse* is of a lightsome, and pleasant Green. The Growing upon *Slopes* is caused, for that *Mosse*, as on the one side it commeth of Moisture and water, so on the other side the *Water* must but Slide, and not stand or Poole. And the *Growing* upon *Tiles*, or *Walls*, &c. is caused, for that those dried Earths, having not Moisture sufficient to put forth a *Plant*, doe practise *Germination* by Putting forth *Mosse*; Though when by Age, or otherwise, they grow to relent and resolve, they 537

ſometimes put forth *Plants*; As *Wall-Flowers*. And almoſt all *Moſſe* hath here and there little Stalkes, beſides the low Thrumme.

538 *Moſſe* groweth upon *Alleyes*, eſpecially ſuch as lie Cold, and upon the North; As in divers Tarraſſes: And againe, if they be much trodden; Or if they were at the firſt, gravelled; For whereſoever *Plants* are kept downe, the Earth putteth forth *Moſſe*.

539 *Old Ground*, that hath been long unbroken up, gathereth *Moſſe*: And therefore Husbandmen uſe to cure their *Paſture Grounds*, when they grow to *Moſſe*, by Tilling them for a yeare, or two: Which alſo dependeth upon the ſame *Cauſe*; For that the more Sparing and Starving Juyce of the Earth, inſufficient for *Plants*, doth breed *Moſſe*.

540 *Old Trees* are more *Moſſie*, (farre) than *Young*; For that the Sap is not ſo franke as to riſe all to the Boughes, but tyreth by the Way, and putteth out *Moſſe*.

541 *Fountaines* have *Moſſe* growing upon the *Ground* about them;

Muſcoſi Fontes; ——— ——— ———

The *Cauſe* is, for that the *Fountaines* draine the *Water* from the *Ground Adjacent*, and leave but ſufficient Moiſture to breed *Moſſe*: And beſides, the *Coldneſſe* of the *Water* conduceth to the ſame.

542 The *Moſſe* of *Trees*, is a kinde of *Haire*; For it is the Juyce of the *Tree*, that is Excerned, and doth not Aſſimilate. And upon great *Trees* the *Moſſe* gathereth a Figure, like a *Leafe*.

543 The *Moiſter Sort* of *Trees* yeeld little *Moſſe*; As we ſee in *Aſps*, *Poplars*, *Willows*, *Beeches*, &c. Which is partly cauſed for the Reaſon that hath been given, of the francke Putting up of the *Sap* into the *Boughes*; And partly, for that the *Barks* of thoſe *Trees*, are more Cloſe, and Smooth, than thoſe of *Oakes*, and *Aſhes*; Whereby the *Moſſe* can the hardlier iſſue out.

544 In *Clay-Grounds*, all *Fruit-Trees* grow full of *Moſſe*, both upon *Body* and *Boughes*; Which is cauſed, partly by the *Coldneſſe* of the *Ground*, whereby the *Plants* nouriſh leſſe; And partly by the *Toughneſſe* of the *Earth*, whereby the *Sap* is ſhut in, and cannot get up, to ſpread ſo franckly, as it ſhould doe.

545 We have ſaid heretofore, that if *Trees* be *Hide-bound*, they wax leſſe Fruitfull, and gather *Moſſe*: And that they are holpen by *Hacking*, &c. And therefore by the Reaſon of Contraries, if *Trees* bee bound in with *Cords*, or ſome Outward *Bands*, they will put forth more *Moſſe*: Which (I thinke) happeneth to *Trees* that ſtand Bleake, and upon the Cold Winds. It would alſo be tried, whether, if you cover a *Tree*, ſomewhat thick upon the top, after his Powling, it will not gather more *Moſſe*. I thinke alſo, the *Watring* of *Trees* with *Cold Fountaine Water*, will make them grow full of *Moſſe*.

546 There is a *Moſſe* the *Perfumers* have, which commeth out of *Apple-Trees*, that hath an Excellent Sent. *Quære* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* ſake, being a Thing of Price, I have ſet down the laſt *Experiments*, how to multiply, and call on *Moſſes*.

Next unto *Moſſe*, I will ſpeake of *Muſhromes*; Which are likewiſe an *Vnperfect Plant*. The *Muſhromes* have two ſtrange *Properties*; The One, that they yeeld ſo *Delicious* a *Meat*; The other, that they *come up* ſo *haſtily*; As in a *Night*; And yet they are *Vnſowne*. And therefore ſuch as are Upſtarts in State, they call

call, in reproach, *Mushromes*. It must needs bee therefore, that they be made of much *Moysture*; And that *Moisture* Fat, Grosse, and yet somwhat Concocted. And (indeed) wee finde, that *Mushromes* cause the *Accident*, which wee call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfet* of them may Suffocate, and Empoyson. And this sheweth, that they are Windy; And that Windinesse is Grosse, and Swelling; Not Sharp, or Griping. And upon the same reason *Mushromes* are a venereous Meat.

547 It is reported, that the *Barke* of *White*, or *Red Poplar*, (which are of the Moistest of *Trees*,) cut small, and cast into *Furrowes* well dunged, will cause the Ground to put forth *Mushromes*, at all *Seasons* of the *Yeare*, fit to be eaten. Some adde to the Mixture *Leaven* of *Bread*, resolved in *Water*.

548 It is reported, that if a *Hilly-Field*, where the *Stubble* is standing, be set on *Fire*, in the *Showry Season*, it will put forth great Store of *Mushromes*.

549 It is reported, that *Harts-Horne*, *Shaven*, or in *Small Peeces*, mixed with *Dung*, and *watred*, putteth up *Mushromes*. And we know that *Harts-Horne* is of a Fat and Clammie Substance: And it may bee *Oxe-Horne* would doe the like.

550 It hath beene reported, though it be scarce credible, that *Ivy* hath growne out of a *Stags-Horne*; which they suppose did rather come from a *Confrication* of the *Horne* upon the *Ivy*, than from the *Horne* it selfe. There is not knowne any Substance, but *Earth*, and the *Precedures* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Mosse*, or *Herby Substance*. There may bee Triall made of some *Seeds*, as that *Fennell-Seed*, *Mustard-Seed*, and *Rape-Seed*, put into some little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to see if they will grow.

551 There is also another *Vnperfect Plant*, that (in shew) is like a great *Mushrome*: And it is sometimes as broad as ones Hat; Which they call a *Toads-Stoole*: But it is not Esculent; And it groweth (commonly) by a dead Stub of a *Tree*; And likewise about the *Roots* of *Rotten-Trees*: And therefore seemeth to take his Juyce from *Wood Putrified*. Which sheweth, by the way, that *Wood Putrified* yeeldeth a franke *Moisture*.

552 There is a *Cake* that groweth upon the Side of a *Dead Tree*, that hath gotten no Name, but it is large, and of a Chesnut Colour, and hard, and pithy; Whereby it should seeme, that even *Dead Trees* forget not their Putting forth; No more than the *Carcasses* of *Mens Bodies* that put forth *Haire*, and *Nailes*, for a Time.

553 There is a *Cod*, or *Bag*, that groweth commonly in the *Fields*; That at the first is hard like a *Tennis-Ball*, and white; And after groweth of a *Mushrome Colour*, and full of light *Dust* upon the Breaking: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to be good for *Kibes*. Belike it hath a *Corrosive*, and *Fretting Nature*.

554 There is an *Herb* called *Iewes-Eare*, that groweth upon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Ashes*. It hath a strange Propertie; For in *Warme Water*, it swelleth, and openeth extremely. It is not greene, but of a duskie browne Colour. And it is used for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to have a Mollifying, and Lenifying Vertue.

There

555 There is a Kinde of *Spongie Excreſcence*, which groweth chiefly upon the *Roots* of the *Laſer-Tree*; And ſometimes upon *Cedar*, and other *Trees*. It is very White, and Light, and Friable: Which we call *Agarick*. It is famous in *Phyſick* for the *Purging* of *Tough flegme*. And it is alſo an excellent *Opener* for the *Liver*: But Offenſive to the *Stomacke*; And in *Taſte* it is, at the firſt, *Sweet*, and after *Bitter*.

556 We finde no *Super-Plant*, that is a Formed *Plant*, but *Meſſeltoe*. They have an idle Tradition, that there is a *Bird*, called a *Miſſel-Bird*, that feedeth upon a *Seed*, which many times ſhee cannot diſgeſt, and ſo expelleth it whole with her Excrement: which falling upon a *Bow* of a *Tree*, that hath ſome Riſt, putteth forth the *Miſſeltoe*. But this is a Fable; For it is not probable, that *Birds* ſhould feed upon that they cannot diſgeſt. But allow that, yet it cannot be for other Reaſons: For Firſt, it is found but upon certain *Trees*; And thoſe *Trees* beare no ſuch *Fruit*, as may allure that *Bird* to ſit, and feed upon them. It may be, that *Bird* feedeth upon the *Miſſeltoe-Berries*, and ſo is often found there; Which may have given occaſion to the Tale. But that which maketh an End of the Queſtion, is, that *Miſſeltoe* hath been found to put forth under the *Boughes*, and not (onely) above the *Boughes*: So it cannot be any Thing that falleth upon the *Bough*. *Miſſeltoe* groweth chiefly upon *Crab-Trees*, *Apple-Trees*, ſometimes upon *Haſles*; And rarely upon *Oakes*; The *Miſſeltoe* whereof is counted very *Medicinall*. It is ever greene, Winter and Summer; And beareth a *White Gliſtering Berry*: And it is a *Plant*, utterly differing from the *Plant*, upon which it groweth. Two things therefore may be certainly ſet downe: Firſt, that *Super-fœtation* muſt be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* muſt be ſuch, as the *Tree* doth excerne, and cannot aſſimilate; For elſe it would goe into a *Bough*; And beſides, it ſeemeth to be more Fat and Unctuous, than the Ordinary *Sap* of the *Tree*; Both by the *Berry*, which is Clammie; And by that it continueth greene, Winter and Summer, which the *Tree* doth not.

557 This *Experiment* of *Miſſeltoe* may give Light to other Practices. Therefore Triall would be made, by Ripping of the *Bough* of a *Crab-Tree*, in the *Barke*; And *Watring* of the Wound every Day, with *Warme-Water Dunged*, to ſee if it would bring forth *Miſſeltoe*, or any ſuch like Thing. But it were yet more likely to trie it, with ſome other *Watring* or *Anointing*, that were not ſo Naturall to the *Tree*, as *Water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they be ſuch Things as kill not the *Bough*.

558 It were good to trie, what *Plants* would put forth, if they bee forbidden to put forth their *Naturall Boughes*: Poll therefore a *Tree*, and cover it, ſome thickneſſe, with *Clay* on the Top; And ſee what it will put forth. I ſuppoſe it will put forth *Roots*; For ſo will a *Cions*, being turned downe into *Clay*: Therefore, in this *Experiment* alſo, the *Tree* would bee cloſed with ſomewhat, that is not ſo Naturall to the *Plant*, as *Clay* is. Trie it with *Leather*, or *Cloth*, or *Painting*, ſo it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

559 A Man may count the *Prickles* of *Trees* to be a kinde of *Excreſcence*; For they will never be *Boughes*, nor beare *Leaves*. The *Plants* that have *Prickles*, are *Thornes*, blacke and white; *Brier*; *Roſe*; *Limon-Trees*; *Crab-Trees*; *Gooſe-Berry*; *Berbery*: Theſe have it in the *Bough*; The *Plants* that have *Prickles* in the *Leafe*, are; *Holly*; *Iuniper*; *Whin-buſh*; *Thiſtle*; *Nettles* alſo have a ſmall Venomous *Prickle*; So hath *Borrage*, but harmeleſſe. The *Cauſe* muſt be *Haſtie Putting forth*; *Want* of *Moiſture*; And the *Cloſeneſſe* of the *Barke*; For the

the *Haſte* of the *Spirit to put forth*, and the *Want* of *Nouriſhment* to put forth a *Bough*, and the *Cloſeneſſe* of the *Barke*, cauſe *Prickles* in *Boughes*; And therefore they are ever like a *Pyramis*, for that the *Moiſture* ſpendeth after a little Putting forth. And for *Prickles* in *Leaves*, they come alſo of *Putting forth more Iuyce* into the *Leafe*, than can ſpread in the *Leafe* ſmooth; and therfore the *Leaves* otherwiſe are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaves* of *Holly*, they are *Smooth*, but never *Plaine*, but as it were with *Folds*, for the ſame *Cauſe*.

There be alſo *Plants*, that though they have no *Prickles*, yet they have a 560
a Kinde of *Downey* or *Velvet Rine*, upon their *Leaves*; As *Roſe-Campion*, *Stock-Gilly-Flowers*, *Colts-Foot*; which *Downe* or *Nap* commeth of a *Subtill Spirit*, in a *Soft* or *Fat Subſtance*. For it is certaine, that both *Stock-Gilly-Flowers*, and *Roſe-Campions*, ſtamped, have been applyed, (with ſucceſſe,) to the *Wreſts* of thoſe that have had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colts-Foot* hath a Sanative vertue, towards the *Lungs*; And the *Leafe* alſo is *Healing* in *Surgery*.

Another Kinde of *Excreſcence* is an *Exudation* of *Plants*, joyned with *Putrefaction*; As wee ſee in *Oake-Apples*, which are found chiefly upon the 561
Leaves of *Oakes*; And the like upon *Willowes*: And Countrey People have a kind of *Prediction*, that if the *Oake-Apple*, broken, be full of *Wormes*, it is a Signe of a *Peſtilent Yeare*; Which is a likely Thing, becauſe they grow of Corruption.

There is alſo upon *Sweet*, or other *Brier*, a fine *Tuft*, or *Bruſh* of *Moſſe*, of 562
divers Colours; Which if you cut, you ſhall ever finde full of little white *Wormes*.

Experiments in Conſort, touching the *Producing* of *Perfect Plants* without *Seed*.

IT is certaine, that *Earth* taken out of the *Foundations* of *Vaults* and *Houſes*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth Sundry Kinds of *Herbs*: But ſome *Time* is required, for the *Germination*; For if it bee taken, but from a *Fathome* deep, it will put forth the *Firſt Yeare*; If much deeper, not till after a *Yeare*, or *Two*. 563

The *Nature* of the *Plants* growing out of *Earth* ſo taken up, doth follow the *Nature* of the *Mould* it ſelfe; As if the *Mould* bee *Soft*, and Fine, it putteth forth Soft *Herbs*; As *Graſſe*, *Plantine*, and the like; If the *Earth* bee Harder and Courſer, it putteth forth *Herbs* more *Rough*, as *Thiſtles*, *Firres*, &c. 564

It is Common *Experience*, that where *Alleyes* are cloſe *Gravelled*, the *Earth* putteth forth, the firſt yeare, *Knot-Graſſe*, and after *Spire-Graſſe*. The *Cauſe* is, for that the *Hard Gravell*, or *Pebble* at the firſt Laying, will not ſuffer the *Graſſe* to come forth upright, but turneth it ro finde his way where it can; But after that the *Earth* is ſomewhat looſened at the Top, the Ordinary *Graſſe* commeth up. 565

It is reported, that *Earth*, being taken out of *Shady* and *Watry Woods*, ſome depth, and Potted, will put forth *Herbs* of a Fat and Juicie Subſtance; As *Penny-wort*, *Purſlane*, *Houſleeke*, *Penny-royall*, &c. 566

The *Water* alſo doth ſend forth *Plants*, that have no *Roots* fixed in the Bottome; But they are leſſe *Perfect Plants*, being almoſt but *Leaves*, and thoſe Small ones: Such is that we call *Duck-Weed*; Which hath a *Leafe* no bigger than a *Thyme-Leafe*, but of a freſher Greene, and putteth forth a little *String* into the *Water*, farre from the *Bottome*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And ſo have a Number of other *Herbs* that grow in *Ponds*. 567

568 It is reported by ſome of the *Ancients*, and ſome *Moderne Teſtimonie* likewiſe, that there be ſome *Plants*, that grow upon the Top of the *Sea*; Being ſuppoſed to grow of ſome *Concretion* of *Slime* from the *Water*, where the *Sunne* beateth hot, and where the *Sea* ſtirreth little. As for *Alga Marina*, (*Sea-weed*,) and *Eryngium* (*Sea-Thiſtle*,) both have *Roots*; but the *Sea-weed* under the *Water*, the *Sea-Thiſtle* but upon the *Shore*.

569 The *Ancients* have noted, that there are ſome *Herbs*, that grow out of *Snow*, laid up cloſe together, and *Putrified*; And that they are all *Bitter*; And they name one eſpecially, *Flomus*, which we call *Moth-Mullein*. It is certain, that *Wormes* are found in *Snow* commonly, like *Earth-Wormes*; And therefore it is not unlike, that it may likewiſe put forth *Plants*.

570 The *Ancients* have affirmed, that there are ſome *Herbs*, that grow out of *Stone*; Which may be, for that it is certaine, that *Toads* have beene found in the Middle of a Free-Stone. We ſee alſo, that *Flints*, lying above *Ground*, gather *Moſſe*; And *Wall-Flowers*, and ſome other *Flowers*, grow upon *Walls*; But whether upon the Maine *Bricke*, or *Stone*, or whether out of the *Lime*, or *Chincks*, is not well obſerved; For *Elders* and *Aſhes* have beene ſeene to grow out of *Steeples*: But they manifeſtly grow out of *Clefts*; In ſo much as when they grow bigge, they will diſ-joyne the *Stone*. And beſides, it is doubtfull, whether the *Mortar* it ſelfe putteth it forth, or whether ſome *Seeds* be not let fall by *Birds*. There be likewiſe *Rock-Herbs*; But I ſuppoſe thoſe are, where there is ſome *Mould* or *Earth*. It hath likewiſe been found, that great *Trees* growing upon *Quarries*, have put downe their *Root* into the *Stone*.

571 In ſome *Mines* in *Germany*, as is reported, there grow in the Bottome *Vegetables*; And the *Worke-Folks* uſe to ſay, they have *Magicall Vertue*; And will not ſuffer men to gather them.

572 The *Sea-Sands* ſeldome beare *Plants*. Whereof the *Cauſe* is yeelded, by ſome of the *Ancients*, for that the *Sunne* exhaleth the *Moiſture*, before it can incorporate with the *Earth*, and yeeld a *Nouriſhment* for the *Plant*. And it is affirmed alſo, that Sand hath (alwayes) his *Root* in *Clay*; And that there be no Veines of *Sand*, any great depth within the *Earth*.

573 It is certaine, that ſome *Plants* put forth for a time, of their owne *Store*, without any *Nouriſhment* from *Earth*, *Water*, *Stone*, &c. Of which *Vide* the *Experiment* 29.

Experiments in Conſort, touching *Forraine Plants*.

IT is reported, that *Earth*, that was brought out of the *Indies*, and other *Remote Countries*, for *Ballaſt* of *Ships*, caſt upon ſome *Grounds* in *Italy*, did put forth *Forraine Herbs*, to us in *Europe* not knowne; And, that which is more, that of their *Roots*, *Barks*, and *Seeds*, contuſed together, and mingled

574 with other *Earth*, and well Watred with *Warme Water*, there came forth *Herbs*, much like the Other.

575 *Plants* brought out of *Hot Countries*, will endeavour to put forth, at the ſame *Time*, that they uſually doe in their owne *Climate*; And therefore to preſerve them, there is no more required, than to keep them from the Injury of Putting back by *Cold*. It is reported alſo, that *Graine* out of the *Hotter Countries* tranſlated into the *Colder*, will be more forward, than the Ordinary *Graine* of the *Cold Countrey*. It is likely, that this will prove better in *Graines*, than in *Trees*; For that *Graines* are but *Annuall*; And ſo the *Vertue* of the *Seed* is not worne out; Whereas in a *Tree*, it is embaſed by the *Ground*, to which it is Removed.

576 Many *Plants*, which grow in the *Hotter Countries*, being ſet in the *Colder*,

der, will nevertheleſſe, even in thoſe *Cold Countries*, being ſowne of *Seeds* late in the *Spring*, come up and abide moſt part of the *Summer*; As wee finde it in *Orenge*, and *Limon-Seeds*, &c. The *Seeds* whereof ſowne in the End of *April*, will bring forth excellent *Sallets*, mingled with other *Herbs*. And I doubt not, but the *Seeds* of *Clove-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be ſowen, would doe the like.

Experiments in Conſort, touching the *Seaſons* in which *Plants* come forth.

577 THere be ſome *Flowers*, *Bloſſomes*, *Graines*, and *Fruits*, which come more *Early*; And others which come more *Late* in the Yeare. The *Flowers* that come early, with us, are; *Prime-Roſes*, *Violets*, *Anemonies*, *Water-Daffadillies*, *Crocus Vernus*, and ſome early *Tulippa's*. And they are all *Cold Plants*; Which therefore, (as it ſhould ſeeme,) have a quicker *Perception* of the *Heat* of the *Sunne* Increaſing, than the *Hot Herbs* have; As a *Cold Hand* will ſooner finde a little *Warmth*, than a *Hot*. And thoſe that come next after, are *Wall-Flowers*, *Cowſlips*, *Hyacinths*, *Roſemary-Flowers*, &c. And after them, *Pincks*, *Roſes*, *Flowerdeluces*, &c. and the lateſt are *Gilly-Flowers*, *Holly-Oakes*, *Larkes-Foot*, &c. The Earlieſt *Bloſſomes* are, the *Bloſſomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of ſuch *Trees*, as have much *Moiſture*, either *Watry*, or *Oily*. And therefore *Crocus Vernus* alſo, being an *Herbe*, that hath an *Oylie Iuyce*, putteth forth early. For thoſe alſo finde the *Sunne* ſooner than the *Drier Trees*. The *Graines* are, firſt *Rie* and *Wheat*; Then *Oats* and *Barley*; Then *Peaſe* and *Beanes*. For though Greene *Peaſe* and *Beanes* be eaten ſooner, yet the Drie Ones, that are uſed for *Horſe-Meat*, are ripe laſt; And it ſeemeth that the Fatter *Graine* commeth firſt. The Earlieſt *Fruits* are, *Strawberries*, *Cherries*, *Gooſeberries*, *Corrans*; And after them *Early Apples*, *Early Peares*, *Apricots*, *Raſps*; And after them, *Damaſins*, and moſt Kinde of *Plums*, *Peaches*, &c. And the lateſt are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-berries*, *Heps*, *Medlars*, *Services*, *Cornelians*, &c.

578 It is to be noted, that (commonly) *Trees* that *ripen lateſt*, *Bloſſome ſooneſt*: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it ſeemeth to be a Worke of Providence, that they bloſſome ſo ſoone; For otherwiſe, they could not have the *Sunne* long enough to ripen.

579 There be Fruits, (but rarely,) that come *twice* a *Yeare*; as ſome *Peares*, *Strawberries*, &c. And it ſeemeth they are ſuch as abound with Nouriſhment; Whereby after one Period, before the *Sunne* waxeth too weake, they can endure another. The *Violet* alſo, amongſt *Flowers*, commeth twice a Yeare; Eſpecially the *Double White*; And that alſo is a *Plant* full of Moiſture. *Roſes* come twice, but it is not without *Cutting*, as hath beene formerly ſaid.

580 In *Muſcovia*, though the *Corne* come not up, till late *Spring*, yet their *Harveſt* is as Early as Ours. The *Cauſe* is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee ſee with us, that if it be a long *Winter*, it is commonly a more *Plentifull Yeare*: And after thoſe kinde of *Winters* likewiſe, the *Flowers*, and *Corne*, which are Earlier, and Later, doe come commonly at once, and at the ſame time; Which troubleth the *Husbandman* many times; For you ſhall have *Red-Roſes*, and *Damaske Roſes*, come together; And likewiſe the *Harveſt* of *Wheat* and *Barley*. But this happeneth ever, for that the Earlier ſtayeth for the Later; And not that the Later commeth ſooner.

581 There be divers *Fruit-Trees*, in the *Hot Countries*, which have *Bloſſomes*, and *Young Fruit*, and *Ripe Fruit*, almoſt all the Yeare, ſucceeding one another. And it is ſaid, the *Orenge* hath the like with us, for a great Part of Summer;

Summer; And so also hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to have so; But that either they want *Iuyce* to spend; Or they meet with the *Cold* of the Winter: And therefore this *Circle* of *Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*.

582 Some *Herbs* are but *Annuall*, and die, *Root* and all, once a Yeare; As *Borrage*, *Lettuce*, *Cucumbers*, *Muske-Melons*, *Basill*, *Tobacco*, *Mustard-Seed*, and all kindes of *Corne*; Some continue many Yeares; As *Hyssope*, *Germander*, *Lavender*, *Fennell*, &c. The *Cause* of the *Dying* is *double*; The first is the *Tendernesse* and *Weakenesse* of the *Seed*, which maketh the Period in a small time; As it is in *Borrage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of these are Hot. The other *Cause* is, for that some *Herbs* can worse endure *Cold*; As *Basill*, *Tobacco*, *Mustard-Seed*. And these have (all) much *Heat*.

Experiments in Consort, touching the *Lasting* of *Herbs* and *Trees*.

THe *Lasting* of *Plants* is most in those that are *Largest* of *Body*; As *Oaks*, *Elme*, *Chest-Nut*, the *Loat-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrary; For *Borage*, *Colewort*, *Pompions*, which are *Herbs* of the *Largest Size*, are of small Durance; Whereas *Hyssope*, *Winter-Savory*, *Germander*, *Thyme*, *Sage*, will last long. The *Cause* is, for that *Trees* last according to the *Strength*, and *Quantity* of their *Sap* and *Iuyce*; Being well munited by their *Barke* against the Injuries of the *Aire*: But *Herbs* draw a Weak *Iuyce*; And have a soft *Stalke*; And therefore those amongst them which last longest, are *Herbs* of *Strong Smell*, and with a *Stickie Stalke*.

583

584 *Trees* that beare *Mast*, and *Nuts*, are commonly more lasting, than those that beare *Fruits*; Especially the *Moister Fruits*: As *Oakes*, *Beeches*, *Chesnuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. last longer than *Apples*, *Peares*, *Plums*, &c. The *Cause* is the *Fatnesse* and *Oylinesse* of the *Sap*; Which ever wasteth lesse, than the more *Watry*.

585 *Trees*, that bring forth their *Leaves* late in the *Yeare*, and cast them likewise late, are more *lasting*, than those that sprout their Leaves Early, or shed them betimes. The *Cause* is, for that the late *Comming forth* sheweth a *Moisture* more fixed; And the other more loose, and more easily resolved. And the same *Cause* is, that *Wilde-Trees* last longer than *Garden-Trees*; And in the same kinde, those whose *Fruit* is Acide, more than those whose *Fruit* is sweet.

586 Nothing procureth the *Lasting* of *Trees*, *Bushes*, and *Herbs*, so much, as often *Cutting*: For every *Cutting* causeth a Renovation of the *Iuyce* of the *Plant*; That it neither goeth so farre, nor riseth so faintly, as when the *Plant* is not *Cut*: Insomuch as *Annuall Plants*, if you cut them seasonably, and will spare the use of them, and suffer them to come up still young, will last more Yeares than one; As hath beene partly touched; Such as is *Lettuce*, *Purslane*, *Cucumber*, and the like. And for *Great Trees*, we see almost all *Overgrowne-Trees*, in Church-yards, or neare Ancient Buildings, and the like, are *Pollards*, or *Dottards*, and not *Trees* at their full Height.

587 Some *Experiment* would be made, how by *Art* to make *Plants* more *Lasting*, than their ordinary Period; As to make a *Stalke* of *Wheate*, &c. last a whole yeare. You must ever presuppose, that you handle it so, as the *Winter* killeth it not; For we speake onely of *Prolonging* the *Naturall Period*. I conceive, that the *Rule* will hold; That whatsoever maketh the *Herbe* come later, than at his time, will make it last longer time: It were good to trie it, in a *Stalke* of *Wheat*, &c. set in the Shade, and encompassed with a Case of *Wood*, not touching the *Straw*, to keep out open *Aire*.

As for the Preservation *of* Fruits, *and* Plants, *as well upon the* Tree, *or* Stalk,

as

as gathered, we ſhall handle it under the Title *of* Conſervation *of* Bodies.

THe *Particular Figures* of *Plants* we leave to their *Deſcriptions*; But ſome few Things, in generall, we will obſerve. *Trees* and *Herbs*, in the Growing forth of their *Boughs*, and *Branches*, are not *Figured*, and keepe no Order. The *Cauſe* is, for that the *Sap*, being reſtrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the Bodies of *Trees*, and *Stalkes* of *Herbs*, till they begin to branch; And then, when they make an Eruption, they breake forth caſually, where they finde beſt way, in the *Barke*, or *Rinde*. It is true, that ſome *Trees* are more ſcattered in their *Boughes*; As *Sallow-Trees*, *Warden-Trees*, *Quince-Trees*, *Medlar-Trees*, *Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almoſt to todd; As the *Peare-Tree*, (which the *Criticks* will have to borrow his name of πῦρ, *Fire*,) *Orenge-Trees*, *Firre-Trees*, *Service-Trees*, *Lime-Trees*, &c. And ſome are more ſpred and broad; As *Beeches*, *Hornebeame*, &c. The reſt are more indifferent. The *Cauſe* of Scattering the *Boughes*, is the Haſty breaking forth of the *Sap*; And therefore thoſe *Trees* riſe not in a *Body* of any Height, but branch neare the *Ground*. The *Cauſe* of the *Pyramis*, is the Keeping in of the *Sap*; long before it branch; And the ſpending of it when it beginneth to branch, by equall degrees. The *Spreading* is cauſed by the *Carrying* up of the *Sap*, plentifully, without Expence; And then putting it forth ſpeedily, and at once.

Experiments in Conſort, touching the ſeverall *Figures* of *Plants*. 588

There be divers *Herbs*, but no *Trees*, that may be ſaid to have ſome kinde of Order, in the Putting forth of their *Leaves*: For they have *Ioynts*, or *Knuckles*, as it were Stops in their *Germination*; As have *Gilly-Flowers*, *Pinks*, *Fennell*, *Corne*, *Reeds*, and *Canes*. The *Cauſe* wherof is, for that the *Sap* aſcendeth unequally, and doth (as it were) tire and ſtop by the way. And it ſeemeth, they have ſome *Cloſeneſſe*, and *Hardneſſe* in their *Stalke*, which hindreth the *Sap* from going up, untill it hath gathered into a Knot, and ſo is more urged to put forth. And therefore, they are moſt of them hollow, when the *Stalke* is drie. As *Fennell-Stalke*, *Stubble*, and *Canes*. 589

Flowers have (all) exquiſite *Figures*; And the *Flower-Numbers* are (chiefly) *Five*, and *Foure*; As in *Prime-Roſes*, *Bryer-Roſes*, *Single Muſk-Roſes*, *Single-Pinks*, and *Gilly-Flowers*, &c. which have five *Leaves*: *Lillies*, *Flower-de-luces*, *Borage*, *Bugloſſe*, &c. which have foure Leaves. But ſome put forth *Leaves* not Numbred; But they are ever ſmall Ones; As *Mary-Golds*, *Trifoile*, &c. Wee ſee alſo, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the Five *Brethren* of the *Roſe*; *Sockets* of *Gilly-Flowers*, &c. *Leaves* alſo are all *Figured*; Some Round; Some long; None Square; And many jagged on the Sides; Which *Leaves* of *Flowers* ſeldome are. For I account the *Iagging* of *Pincks*, and *Gilly-Flowers*, to be like the inequalitie of *Oak-Leaves*, or *Vine-Leaves*, or the like; But they ſeldome or never have any ſmall *Purles*. 590

OF *Plants*, ſome few put forth their *Bloſſomes* before their *Leaves*; As *Almonds*, *Peaches*, *Cornelians*, *Black-Thorne*, &c. But moſt put forth ſome *Leaves* before their *Bloſſomes*; As *Apples*, *Pears*, *Plums*, *Cherries*, *White-Thorn*, &c. The *Cauſe* is, for that thoſe, that put forth their *Bloſſomes* firſt, have either an Acute and *Sharp Spirit*; (And therefore commonly they all put forth early in the Spring, and ripen very late; As moſt of the Particulars before mentioned;) Or elſe an *Oylie Iuyce*, which is apter to put out *Flowers*, than *Leaves*.

Experiments in Conſort, touching ſome *Principall Differences* in *Plants*. 591

Of *Plants*, ſome are *Greene* all *Winter*; Others caſt their *Leaves*. There are *Greene* all *Winter*; *Holly*, *Ivy*, *Box*, *Firre*, *Eugh*, *Cypreſſe*, *Iuniper*, *Bayes*, *Roſe-Mary*, &c. The *Cauſe* of the Holding *Greene*, is the Cloſe and Compact *Sub-* 592

ſtance of their *Leaves*, and the *Pedicles* of them. And the *Cauſe* of that againe, is either the *Tough* and *Viſcous Iuyce* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the firſt Sort is *Holly*; Which is of ſo *Viſcous* a *Iuyce*, as they make *Birdlime* of the *Barke* of it. The *Stalke* of *Ivy* is Tough, and not Fragile, as wee ſee in other ſmall Twigs drie. *Firre* yeeldeth *Pitch*. *Box* is a faſt and heavy *Wood*, as we ſee it in *Boules*. *Eugh* is a Strong and Tough *Wood*, as we ſee it in *Bowes*. Of the Second Sort is *Iuniper*, which is a *Wood* Odorate; and maketh a hot Fire. *Bayes* is like-wiſe a Hot and Aromaticall *Wood*; And ſo is *Roſe-Mary* for a *Shrub*. As for the *Leaves*, their Denſitie appeareth, in that, either they are Smooth and Shining, as in *Bayes*, *Holly*, *Ivie*, *Box*, &c. Or in in that they are Hard and Spirie, as in the reſt. And Triall would bee made of *Grafting* of *Roſe-Mary*, and *Bayes*, and *Box*, upon a *Holly-Stocke*; Becauſe they are *Plants* that come all *Winter*. It were good to trie it alſo with *Grafts* of other *Trees*, either *Fruit-Trees*, or *Wilde Trees*; To ſee whether they will not yeeld their *Fruit*, or beare their *Leaves*, later, and longer in the *Winter*; becauſe the *Sap* of the *Holly* putteth forth moſt in the *Winter*. It may bee alſo a *Mezerion-Tree*, grafted upon a *Holly*, will prove both an Earlier, and a Greater *Tree*.

593 There be ſome *Plants*, that beare no *Flower*, and yet beare *Fruit*: There be ſome, that beare *Flowers*, and no *Fruit*: There be ſome, that beare neither *Flowers*, nor *Fruit*. Moſt of the great *Timber-Trees*, (as *Oakes*, *Beeches*, &c.) beare no apparent *Flowers*: Some few (likewiſe) of the *Fruit-Trees*; As *Mulberry*, *Walnut*, &c. And ſome *Shrubs*, (as *Iuniper*, *Holly*, &c.) beare no *Flowers*. Divers *Herbs* alſo beare *Seeds*, (which is as the *Fruit*,) and yet beare no *Flowers*; As *Purſlane*, &c. Thoſe that beare *Flowers*, and no *Fruit*, are few; As the *Double Cherry*, the *Sallow*, &c. But for the *Cherry*, it is doubtfull, whether it be not by Art, or Culture; For if it bee by Art, then Triall would be made, whether *Apples*, and other *Fruits Bloſſomes*, may not be doubled. There are ſome Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars*, *Box*, *Brakes*, &c.

594 There be ſome *Plants*, that ſhoot ſtill upwards, and can *Support* themſelves; As the greateſt Part of *Trees*, and *Plants*: There be ſome Other, that *Creep* along the *Ground*; Or *Winde* about other *Trees*, or *Props*, and cannot ſupport themſelves; As *Vines*, *Ivie*, *Briar*, *Briony*, *Wood-bines*, *Hop's*, *Climatis*, *Camomill*, &c. The *Cauſe* is, (as hath beene partly touched,) for that all *Plants*, (naturally) move upwards; But if the *Sap* put up too faſt, it maketh a ſlender *Stalke*, which will not ſupport the weight: And therefore theſe latter Sort are all Swift and Haſtie Commers.

Experiments in Conſort, touching all Manner of *Compoſts*, and *Helps* of *Ground*.

THe firſt and moſt Ordinary *Helpe* is *Stercoration*. The *Sheeps-Dung* is one of the beſt; And next, the *Dung* of *Kine*: And thirdly, that of *Horſes*: Which is held to be ſomewhat too hot, unleſſe it be mingled. That of *Pigeons* for a Garden, as a ſmall Quantity of Ground, Excelleth. The *Ordering* of *Dung* is; If the *Ground* be *Arable*, to ſpread it immediately before the *Ploughing* and *Sowing*; And ſo to *Plough* it in: For if you ſpread it long before, the *Sunne* will draw out much of the *Fatneſſe* of the *Dung*: If the *Ground* be *Grazing Ground*, to ſpread it ſomewhat late, towards *Winter*; That the *Sunne* may have the leſſe Power to drie it up. As for ſpeciall *Compoſts* for *Gardens*, (as a *Hot Bed*, &c. (we have handled them before.

596 The Second *Kind* of *Compoſt*, is, the *Spreading* of divers *Kinds* of *Earth*; As *Marle*, *Chalke*, *Sea-Sand*, *Earth* upon *Earth*, *Pond-Earth*; And the *Mixtures* of them. *Marle* is thought to be the beſt; As having moſt *Fatneſſe*; And not Heating

Heating the *Ground* too much. The next is *Sea-Sand*; Which (no doubt) obtaineth a speciall Vertue, by the *Salt*: For *Salt* is the first Rudiment of life. *Chalke* over-heateth the *Ground* a little. And therefore is best upon *Cold Clay-Grounds*, or *Moist Grounds*: But I heard a great *Husband* say, that it was a common Errour, to thinke that *Chalke* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Whereas (indeed) it helpeth *Grasse*, as well as *Corne*: but that which breedeth the Errour is, because after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Rest; And then (indeed) afterwards it will beare little *Grasse*, because the *Ground* is tyred out. It were good to trie the laying of *Chalke* upon *Arable Grounds*, a little while before *Ploughing*; And to *Plough* it in, as they doe the *Dung*; But then it must bee Friable first, by Raine, or Lying: As for *Earth*, it *Compasseth* it Selfe; For I knew a *Great Garden*, that had a *Field* (in a manner) powred upon it; And it did beare *Fruit* excellently the first yeare of the Planting: For the *Surface* of the *Earth* is ever the Fruitfullest. And *Earth* so prepared hath a double *Surface*. But it is true, as I conceive, that such *Earth*, as hath *Salt-Petre* bred in it, if you can procure it without too much charge, doth excell. The way to hasten the *Breeding* of *Salt-Petre*, is to forbid the Sunne, and the Growth of *Vegetables*. And therefore, if you make a large Hovell, thatched, over some Quantity of Ground; Nay, if you doe but Planck the Ground over, it will breed *Salt-Petre*. As for *Pond-Earth*, or *River-Earth*, it is a very good *Compost*; Especially if the *Pond* have beene long uncleansed, and so the *Water* be not too Hungry: And I judge it will be yet better, if there bee some *Mixture* of *Chalke*.

597 The Third *Helpe* of *Ground*, is, by some other *Substances*, that have a Vertue to make *Ground* Fertile; though they bee not meerely *Earth*: wherein *Ashes* excell; In so much as the Countries about *Ætna*, and *Vesuvius*, have a kinde of Amends made them, for the Mischiefe the Eruptions (many times) doe, by the exceeding *Fruitfulnesse* of the *Soile*, caused by the *Ashes*, scattered about. *Soot* also, though thinne spred, in a *Field* or *Garden*, is tried to bee a very good *Compost*. For *Salt*, it is too Costly: But it is tried, that mingled with *Seed-Corne*, and sowen together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed-Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* all over. As for the *Steeping* of the *Seeds*, in severall *Mixtures* with *Water*, to give them Vigour; Or *Watring Grounds* with *Compost-Water*; We have spoken of them before.

598 The Fourth *Helpe* of *Ground*, is, the *Suffering* of *Vegetables to die into the Ground*; And so to Fatten it; As the *Stubble* of *Corne*, Especially *Pease*. *Brakes* cast upon the *Ground*, in the beginning of *Winter*, will make it very Fruitfull. It were good (also) to trie, whether *Leaves* of *Trees* swept together, with some *Chalke* and *Dung* mixed, to give them more Heart, would not make a good *Compost*: For there is nothing lost, so much as *Leaves* of *Trees*; And as they lie scattered, and without Mixture, they rather make the *Ground* soure, than otherwise.

599 The Fifth *Help* of *Ground*, is *Heat* and *Warmth*. It hath been anciently practised to burne *Heath*, & *Ling*, and *Sedge*, with the vantage of the *Winde*, upon the *Ground*: Wee see, that *Warmth* of *Walls* and *Enclosures*, mendeth *Ground*: Wee see also that *Lying open* to the *South*, mendeth *Ground*: We see againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *Warmth*, as by their *compost*: And it may bee doubted, whether the *Covering* of the *Ground* with *Braks*, in the Beginning of the *Winter*, (whereof we spake in the last *Experiment*,) helpeth it not, by reason of the *Warmth*. Nay some very good

Husbands doe ſuſpect, that the *Gathering* up of *Flints*, in *Flinty Ground*, and Laying them on *Heaps*, (which is much uſed,) is no good *Husbandry*; For that they would keepe the *Ground* Warme.

600 The Sixth *Helpe* of *Ground* is, by *Watering*, and *Irrigation*; which is in two Manners: The one by *Letting* in, and *Shutting* out *Waters*, at ſeaſonable Times: For *Water*, at ſome Seaſons, and with reaſonable ſtay, doth good; But at ſome other Seaſons, and with too long Stay, doth hurt. And this ſerveth onely for *Meadowes*, which are along ſome *River*. The other way is, to bring *Water*, from ſome *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in ſome long *Furrowes*; And from thoſe *Furrowes*, drawing it traverſe to ſpread the *Water*. And this maketh an excellent Improvement, both for *Corne*, and *Graſſe*. It is the richer, if thoſe *Hanging Grounds* be fruitfull, becauſe it waſheth off ſome of the Fatneſſe of the *Earth*: But howſoever it profiteth much. Generally, where there are great Overflowes, in *Fens*, or the like, the drowning of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cauſe* may be, for that it keepeth the *Ground* warme, and nouriſheth it: But the *Fen-Men* hold, that the *Sewers* muſt be kept ſo, as the *Water* may not ſtay too long in the *Spring*, till the *Weeds* and *Sedge* be growne up; For then the *Ground* will bee like a Wood, which keepeth out the Sunne; And ſo continueth the Wet; Whereby it will never graze (to purpoſe) that yeare. Thus much for *Irrigation*. But for *Avoidances*, and *Draynings* of water, where there is too much, and the *Helps* of *Ground* in that kinde, wee ſhall ſpeake of them in another Place.

NATU-

NATVRALL HISTORIE.

VII. Century.

THe *Differences* betweene *Animate* and *Inanimate Bodies*, we ſhall handle fully under the *Title* of *Life*, and *Living Spirits*, and *Powers*. We ſhall therefore make but a briefe Mention of them in this Place. The Maine *Differences* are two. All *Bodies* have *Spirits*, and *Pneumaticall Parts* within them: But the Maine *Differences* betweene *Animate* and *Inanimate*, are two: The firſt is, that the *Spirits* of *Things Animate*, are all *Continued* with themſelves, and are *Branched* in *Veines*, and ſecret *Canales*, as *Bloud* is: And in *Living Creatures*, the *Spirits* have not onely *Branches*, but certaine *Cells* or *Seats*, where the *Principall Spirits* doe reſide, and whereunto the reſt doe reſort: But the *Spirits* in *Things Inanimate* are ſhut in, and cut off by the *Tangible Parts*; And are not pervious one to another; As *Aire* is in *Snow*. The ſecond Maine *Difference* is, that the *Spirits* of *Animate Bodies* are all in ſome degree, (more or leſſe,) kindled and inflamed; And have a fine *Commixture* of *Flame*, and an *Aëriall Subſtance*. But *Inanimate Bodies* have their *Spirits* no whit *Inflamed*, or *Kindled*. And this *Difference* conſiſteth not in the *Heat* or *Cooleneſſe* of *Spirits*; For *Cloves* and other *Spices*, *Naptha* and *Petroleum*, have exceeding *Hot Spirits*, (hotter a great deale than *Oile*, *Waxe*, or *Tallow*, &c.) but not *Inflamed*. And when any of thoſe Weake and Temperate *Bodies* come to bee Inflamed, then they gather a much greater *Heat*, than others have *Vn-inflamed*; beſides their *Light*, and *Motion*, &c.

Experiments in Conſort, touching the *Affinities*, and *Differences*, between *Plants* and *Inanimate Bodies*.

601

The *Differences*, which are *Secondary*, and proceed from theſe two *Radicall Differences*, are; Firſt, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to Spread and Continue it ſelfe; So farre goeth the *Shape*, or *Figure*; And then is *determined*. Secondly, *Plants* doe nouriſh; *Inanimate Bodies* doe not: They have an *Accretion*, but no *Alimentation*. Thirdly, *Plants* have a *Period* of *Life*; which *Inanimate Bodies* have not. Fourthly, they have a *Succeſſion*, and *propagation* of their *Kinde*; which is not in *Bodies Inanimate*.

602

603 The *Differences* between *Plants*, and *Metals* or *Fossiles* besides those foure before mentioned; (For *Metalls* I hold Inanimate,) are these: First, *Metals* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part above *Earth*, and part under *Earth*.

604 There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metalls* both; *Corall* is one of the Neareſt of both *Kindes*: Another is *Vitrioll*, for that is apteſt to ſprout with *Moiſture*.

605 Another ſpeciall *Affinitie* is betweene *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* (if it diſſolve not in *Arefaction*) will in the end iſſue into *Plants*, or *Living Creatures* bred of *Putrefaction*. I account *Moſſe*, and *Muſhromes* and *Agaricke*, and other of thoſe kinds, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Fleſh*, and *Fiſh*, and *Plants* themſelves, and a Number of other things, after a *Mouldineſſe*, or *Rottennes*, or *Corrupting*, they will fall to breed *Wormes*. Theſe *Putrefactions*, which have *Affinitie* with *Plants*, have this *Difference* from them; That they have no *Succeſſion* or *Propagation*, though they *Nouriſh*, and have a *Period* of *Life*, and have likewiſe ſome *Figure*.

606 I left once, by chance, a *Citron* cut, in a cloſe Roome, for three Summer-moneths, that I was abſent; And at my Returne, there were growne forth, out of the Pith cut, *Tufts* of *Haires*, an Inch long, with little blacke Heads, as if they would have beene ſome *Herbe*.

Experiments in Conſort, touching the *Affinities*, and *Differences*, of *Plants*, and *Living Creatures*: And the *Confines* and *Participles* of them.

THe *Affinities* and *Differences* betweene *Plants* and *Living Creatures*, are theſe that follow. They have both of them *Spirits Continued*, and *Branched*, and alſo *Inflamed*: But firſt in *Living Creatures*, the *Spirits* have a *Cell* or *Seat*, which *Plants* have not; As was alſo formerly ſaid. And ſecondly, the *Spirits* of *Living Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And theſe two are the *Radicall Differences*. For the *Secondary Differences*, They are, as follow. Firſt, *Plants* are all *Fixed* to the *Earth*; Whereas all *Living Creatures* are ſevered, and of themſelves. Secondly, *Living Creatures* have *Locall Motion*; *Plants* have not. Thirdly, *Living Creatures* nouriſh from their *Vpper Parts*, by the *Mouth* chiefly; *Plants* nouriſh from below, namely from the *Rootes*. Fourthly, *Plants* have their *Seed* and *Seminall Parts* uppermoſt; *Living Creatures* have them lowermoſt: And therefore it was ſaid, not elegantly alone, but Philoſophically; *Homo eſt Planta inverſa*; *Man is like a Plant turned upwards*: For the *Root* in *Plants*, is as the *Head* in *Living Creatures*. Fifthly, *Living Creatures* have a more exact *Figure* than *Plants*. Sixthly, *Living Creatures* have more *Diverſity* of *Organs* within their *Bodies*, and (as it were) *Inward Figures*, than *Plants* have. Seventhly, *Living Creatures* have *Senſe*, which *Plants* have not. Eighthly, *Living Creatures* have *Voluntary Motion*, which *Plants* have not.

607

608 For the *Difference* of *Sexes* in *Plants*, they are oftentimes by name diſtinguiſhed; As *Male-Piony*, *Female-Piony*; *Male-Roſe-mary*, *Female-Roſe-mary*; *Hee-Holly*, *Shee-Holly*, &c. but *Generation* by *Copulation* (certainly) extendeth not to *Plants*. The neareſt Approach of it, is betweene the *Hee-Palme*, and the *Shee-Palme*; which, (as they report,) if they grow neare, incline the one to the other: In ſo much as, (that which is more ſtrange,) they doubt not to report, that to keep the *Trees* upright from Bending, they tye *Ropes*, or *Lines*, from the one to the other, that the *Contact* might be enjoyed by the *Contact* of a *Middle Body*. But this may be Faigned, or at leaſt Amplified. Nevertheleſſe, I am apt enough to thinke, that this ſame *Binarium* of a

Stronger

Stronger and a Weaker, like unto *Masculine* and *Feminine*, doth hold in all *Living Bodies*. It is confounded sometimes; As in some *Creatures* of *Putrefaction*, wherein no *Markes* of *Distinction* appeare: and it is doubled sometimes; As in *Hermaphrodites*: But generally there is a Degree of Strength in most *Species*.

609 The *Participles* or *Confiners* between *Plants* and *Living Creatures*, are such chiefly, as are *Fixed*, and have no *Locall Motion* of *Remove*, though they have a *Motion* in their *Parts*; Such as are *Oysters*, *Cockles*, and such like. There is a Fabulous Narration, that in the *Northerne Countries*, there should be an *Herb* that groweth in the likenesse of a *Lambe*, and feedeth upon the *Grasse*, in such sort, as it will bare the *Grasse* round about. But I suppose that the *Figure* maketh the *Fable*; For so wee see, there be *Bee-Flowers*, &c. And as for the *Grasse*, it seemeth the *Plant*, having a great *Stalke* and *Top*, doth prey upon the *Grasse*, a good way about, by drawing the *Iuyce* of the *Earth* from it.

Experiments *Promiscuous* touching *Plants*.

610 The *Indian Fig* boweth his *Roots* downe so low, in one yeare, as of it selfe it taketh *Root* againe: And so multiplyeth from *Root* to *Root*; Making of one *Tree* a kinde of *Wood*. The *Cause* is the *Plenty* of the *Sap*, and the *Softnesse* of the *Stalke*, which maketh the *Bough*, being over-loaden, and not stiffely upheld, weigh downe. It hath *Leaves*, as broad as a little *Target*, but the *Fruit* no bigger than *Beanes*. The *Cause* is, for that the continuall Shade increaseth the *Leaves*, and abateth the *Fruit*; which nevertheless is of a pleasant Taste. And that (no doubt) is caused, by the *Suppleness* and *Gentleness* of the Juyce of that *Plant*, being that which maketh the *Boughes* also so Flexible.

611 It is reported by one of the *Ancients*, that there is a certain *Indian Tree*, having few, but very great, *Leaves*, three Cubits long, and two broad; And that the *Fruit* being of good Taste, groweth out of the *Barke*. It may be, there be *Plants* that poure out the *Sap* so fast, as they have no leisure, either to divide into many *Leaves*, or to put forth *Stalkes* to the *Fruit*. With us *Trees* (generally) have small *Leaves* in comparison. The *Fig* hath the greatest; And next it the *Vine*, *Mulberry*, and *Sycamore*; And the least are those of the *Willow*, *Birch*, and *Thorne*. But there be found *Herbs* with farre greater *Leaves* than any *Tree*; As the *Burre*, *Gourd*, *Cucumber*, and *Colewort*. The *Cause* is, (like to that of the *Indian Fig*,) the hasty and plentifull Putting forth of the *Sap*.

612 There be three *Things* in use for *Sweetnesse*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was scarce knowne, and little used. It is found in *Canes*: *Quære*, whether to the first *Knuckle*, or further up? And whether the very *Barke* of the *Cane* it selfe doe yeeld *Sugar*, or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I have heard from one, that was industrious in Husbandry, that the labour of the *Bee* is about the *Wax*; And that hee hath knowne in the beginning of *May*, *Honey-Combes* empty of *Honey*; And within a fortnight, when the Sweet *Dewes* fall, filled like a *Cellar*. It is reported by some of the *Ancients*, that there is a *Tree* called *Occhus*, in the Valleyes of *Hyrcania*, that distilleth *Honey* in the *Mornings*. It is not unlike, that the *Sap* and *Teares* of some *Trees*, may be sweet. It may be also, that some sweet Juyces, fit for many uses, may bee concocted out of *Fruits*, to the Thickenesse of *Honey*, or perhaps of *Sugar*; The likeliest are *Rasins* of the Sunne, *Figs*, and *Corrans*: The Meanes may be enquired.

613 The *Ancients* report of a *Tree*, by the *Persian Sea*, upon the *Shore-Sands*, which

which is nouriſhed with the *Salt-Water*; And when the *Tide* ebbeth, you ſhall ſee the *Roots*, as it were, bare without *Barke*, (being as it ſeemeth corroded by the *Salt*,) and graſping the *Sands* like a *Crab*; Which nevertheleſſe beareth a *Fruit*. It were good to trie ſome *Hard Trees*, as a *Service-Tree*, or *Firre-Tree*, by ſetting them within the *Sands*.

614 There bee of *Plants*, which they uſe for *Garments*, theſe that follow. *Hempe*; *Flax*; *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silke*; They make alſo *Cables* of the *Barke* of *Lime-Trees*. It is the *Stalke* that maketh the *Filaceous* Matter, commonly; And ſometimes the *Downe* that groweth above.

615 They have, in ſome *Countries*, a *Plant* of a *Roſy Colour*, which ſhutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noone*; which the *Inhabitants* of thoſe *Countries* ſay is a *Plant* that *Sleepeth*. There bee *Sleepers* enough then; For almoſt all *Flowers* doe the like.

616 Some *Plants* there are, but rare, that have a *Moſſy* or *Downy Root*; And likewiſe that have a Number of *Threds*, like *Beards*; As *Mandrakes*; whereof *Witches*, and *Impoſtours* make an ugly *Image*, giving it the Forme of a *Face* at the *Top* of the *Root*, and leave thoſe *Strings* to make a broad *Beard* down to the Foot. Alſo there is a Kinde of *Nard*, in *Creet*, (being a Kinde of *Phu*) that hath a *Root* hairy, like a *Rough-Footed-Doves* foot. So as you may ſee, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirſute Roots*. And, I take it, in the *Bulbous*, the Sap haſteneth moſt to the Aire, and Sunne: In the *Fibrous*, the Sap delighteth more in the Earth, and therefore putteth downward: And the *Hirſute* is a Middle betweene both; That beſides the Putting forth upwards, and downwards; putteth forth in Round.

617 There are ſome *Teares* of *Trees*, which are kembed from the *Beards* of *Goats*: For when the *Goats* bite and crop them, eſpecially in the Mornings, the Dew being on, the *Teare* commeth forth, and hangeth upon their *Beards*: Of this Sort is ſome kinde of *Ladanum*.

618 The *Irrigation* of the *Plane-Tree* by *Wine*, is reported by the *Ancients*, to make it Fruitfull. It would be tried likewiſe with *Roots*; For upon *Seeds* it worketh no great Effects.

619 The way to carry *Forraine Roots*, a long Way, is to veſſell them cloſe in *Earthen Veſſels*. But if the *Veſſels* be not very Great, you muſt make ſome Holes in the Bottome, to give ſome Refreſhment to the *Roots*; Which otherwiſe (as it ſeemeth,) will decay, and ſuffocate.

620 The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the Dryeſt; And thoſe Things, which are knowne to comfort other *Plants*, did make that more Sterill: For in *Showers* it proſpered worſt: It grew alſo amongſt *Buſhes* of other kindes, where commonly *Plants* doe not thrive: Neither did it love the Sunne: There might be one *Cauſe* of all thoſe Effects; Namely, the ſparing Nouriſhment, which that *Plant* required. *Quære* how farre *Caſſia*, which is now the Subſtitute of *Cinnamon*, doth participate of theſe Things.

621 It is reported by one of the *Ancients*, that *Caſſia*, when it is gathered, is put into the *Skins* of *Beaſts*, newly fleyed; And that the *Skins* Corrupting, and Breeding *Wormes*, the *Wormes* doe devoure the *Pith* and *Marrow* of it, and ſo make it Hollow; But Meddle not with the *Barke*, becauſe to them it is bitter.

622 There were, in Ancient Time, *Vines*, of farre greater *Bodies*, then we know any; For there have been *Cups* made of them, and an *Image* of *Iupiter*. But it is like they were *Wilde-Vines*; For the *Vines*, that they uſe for *Wine*, are ſo often

often Cut, and so much Digged and Dressed, that their Sap spendeth into the *Grapes*, and so the *Stalke* cannot increase much in *Bulke*. The *Wood* of *Vines* is very durable, without *Rotting*. And that which is strange, though no *Tree* hath the *Twigges*, while they are green, so brittle, yet the *Wood* dried is extreame Tough; And was used by the *Captaines* of *Armies*, amongst the *Romans*, for their *Cudgells*.

623 It is reported, that in some Places, *Vines* are suffered to grow like *Herbs*, spreading upon the *Ground*; And that the *Grapes* of those *Vines* are very great. It were good to make triall, whether *Plants* that use to bee borne up by Props, will not put forth greater *Leaves*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Ivie*, *Woodbine*, &c.

624 *Quinces*, or *Apples*, &c. if you will keep them long, drowne them in *Honey*; But because *Honey* (perhaps) will give them a Taste Overlushious, it were good to make Triall in *Powder* of *Sugar*; Or in *Syrrup* of *Wine* onely Boyled to Height. Both these would likewise be tried in *Orenges*, *Limons*, and *Pomegranats*; For the *Powder* of *Sugar*, and *Syrrup* of *Wine*, will serve for times more than once.

625 The *Conservation* of *Fruit* would be also tried in *Vessels*, filled with *Fine Sand*, or with *Powder* of *Chalke*; Or in *Meale* and *Flower*; Or in *Dust* of *Oakewood*; Or in *Mill*.

626 Such *Fruits*, as you appoint for *Long Keeping*, you must gather before they be full *Ripe*; And in a *Faire* and *Drie Day*, towards *Noone*; And when the *Winde* bloweth not *South*; And when the *Moone* is under the *Earth*; And in *Decrease*.

627 Take *Grapes*, and hang them in an *Empty Vessell*, well Stopped; And set the *Vessell*, not in a *Cellar*, but in some drie *Place*; And it is said, they will last long. But it is reported by some, they will keepe better, in a *Vessell* halfe full of *Wine*, so that the *Grapes* touch not the *Wine*.

628 It is reported, that the *Preserving* of the *Stalke*, helpeth to preserve the *Grape*; Especially if the *Stalke* be put into the *Pith* of *Elder*, the *Elder* not touching the *Fruit*.

629 It is reported by some of the *Ancients*, that *Fruit* put in *Bottles*, and the *Bottles* let downe into *Wells* under *Water*, will keep long.

630 Of *Herbs* and *Plants*, some are good to eat *Raw*; As *Lettuce*, *Endive*, *Purslane*, *Tarragon*, *Cresses*, *Cucumbers*, *Musk-Melons*, *Radish*, &c. Others onely after they are *Boyled*, or have *Passed the Fire*; As *Parsley*, *Clary*, *Sage*, *Parsnips*, *Turnips*, *Asparagus*, *Artichoakes*, (though they also being young are eaten *Raw*:) But a Number of *Herbs* are not *Esculent* at all; As *Worme-Wood*, *Grasse*, *Greene-Corne*, *Centory*, *Hyssope*, *Lavender*, *Balme*, &c. The *Causes* are, for that the *Herbs*, that are not *Esculent*, doe want the two *Tastes*, in which *Nourishment* resteth; Which are, *Fat*, and *Sweet*; And have (contrariwise) *Bitter*, and *Over-strong Tastes*, or a *Iuyce* so Crude, as cannot bee ripened to the degree of *Nourishment*. *Herbs* and *Plants*, that are *Esculent Raw*, have *Fatnesse*, or *Sweetnesse*, (as all Esculent *Fruits*;) Such are *Onions*, *Lettuce*, &c. But then it must be such a *Fatnesse*, (for as for *Sweet Things*, they are in effect alwayes *Esculent*,) as is not Over-grosse, and Loading of the *Stomach*; For *Parsnips* and *Leekes* have *Fatnesse*; But it is too Grosse and Heavy without *Boyling*. It must be also in a Substance somewhat Tender; For wee see *Wheat*, *Barley*, *Artichoakes*, are no good *Nourishment*, till they have passed the *Fire*; But the *Fire* doth ripen, and maketh them soft and tender, and so they become *Esculent*. As for *Radish*, and *Tarragon*, and the like, they are for *Condiments*, and not for *Nourishment*. And even some of those *Herbes*, which are not *Esculent*,

lent, are notwithstanding *Poculent*; As *Hop's*, *Broome*, &c. *Quære* what *Herbs* are good for *Drinke*, besides the two aforenamed; For that it may (perhaps) ease the Charge of *Brewing*, if they make *Beere* to require lesse *Malt*, or make it last longer.

631 *Parts* fit for the *Nourishment* of *Man*, in *Plants*, are, *Seeds*, *Roots*, and *Fruits*; But chiefly *Seeds*, and *Roots*. For *Leaves*, they give no *Nourishment* at all, or very little: No more doe *Flowers*, or *Blossomes*, or *Stalkes*. The Reason is, for that *Roots*, and *Seeds*, and *Fruits*, (in as much as all *Plants* consist of an *Oyly* and *Watrie Substance* commixed,) have more of the *Oily Substance*; And *Leaves*, *Flowers*, &c. of the *Watry*. And secondly, they are more *Concocted*; For the *Root*, which continueth ever in the *Earth*, is still *Concocted* by the *Earth*; And *Fruits*, and *Graines*, (wee see) are halfe a yeare, or more, in *Concocting*; Whereas *Leaves* are out, and Perfect in a Moneth.

632 *Plants* (for the most part) are more strong, both in *Taste*, and *Smell*, in the *Seed*, than in the *Leafe*, and *Root*. The *Cause* is, for that in *Plants*, that are not of a Fierce and Eager *Spirit*, the Vertue is increased by *Concoction*, and *Maturation*, which is ever most in the *Seed*; But in *Plants*, that are of a Fierce and Eager Spirit, they are stronger whilest the *Spirit* is enclosed in the *Root*; And the *Spirits* doe but weaken, and dissipate, when they come to the *Aire*, and *Sunne*; As wee see it in *Onions*, *Garlicke*, *Dragon*, &c. Nay there be *Plants*, that have their *Roots* very *Hot*, and *Aromaticall*; And their *Seeds* rather *Insipide*; As *Ginger*. The *Cause* is (as was touched before,) for that the *Heat* of those *Plants* is very Dissipable; which under the *Earth* is contained and held in; But when it commeth to the *Aire*, it exhaleth.

633 The *Iuyces* of *Fruits* are either *Watry*, or *Oylie*. I reckon amongst the *Watry*, all the *Fruits* out of which *Drinke* is expressed; As the *Grape*, the *Apple*, the *Peare*, the *Cherry*, the *Pomegranate*, &c. And there are some others, which, though they be not in use for *Drinke*, yet they appeare to bee of the same *Nature*; As *Plums*, *Services*, *Mulberries*, *Rasps*, *Orenges*, *Limons*, &c. And for those *Iuyces*, that are so fleshy, as they cannot make *Drinke* by Expression, yet (perhaps) they may make *Drinke* by Mixture of *Water*;

Poculaque admistis imitantur vitea Sorbis.

And it may be *Heps* and *Brier-Berries* would doe the like. Those that have *Oylie Iuyces*, are; *Olives*, *Almonds*, *Nuts* of all sorts, *Pine-Apples*, &c. And their *Iuyces* are all *Inflammable*. And you must observe also, that some of the *Watry Iuyces*, after they have gathered *Spirit*, will Burne and Enflame; As *Wine*. There is a Third Kinde of *Fruit*, that is sweet, without either *Sharpenesse*, or *Oylinesse*: Such as is the *Fig*, and the *Date*.

634 It hath beene noted, that most *Trees*, and specially those that beare *Mast*, are fruitfull but once in two yeares. The *Cause* (no doubt) is, the *Expence* of *Sap*; For many *Orchard-Trees*, well Cultured, will beare divers yeares together.

635 There is no *Tree*, which besides the *Naturall Fruit*, doth beare so many *Bastard-Fruits*, as the *Oake* doth: For besides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certaine *Oake-Nuts*, which are Inflammable; And certaine *Oake-Berries*, sticking close to the *Body* of the *Tree*, without *Stalke*. It beareth also *Misseltoe*, though rarely. The *Cause* of all these may be, the *Closenesse* and *Solidnesse* of the *Wood*, and *Pith* of the *Oake*; Which maketh severall *Iuyces* finde severall *Eruptions*. And therefore if you will devise to make any *Super-Plants*, you must ever give the *Sap* Plentifull Rising, and Hard Issue.

There

There are two *Excreſcences*, which grow upon *Trees*; Both of them in the Nature of *Muſhromes*: The one the *Romanes* called *Boletus*; Which groweth upon the *Roots* of *Oakes*; And was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agaricke*, (whereof we have ſpoken before,) which groweth upon the Tops of *Oakes*; Though it be affirmed by ſome, that it groweth alſo at the *Roots*. I doe conceive, that many *Excreſcences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into ſome *Preternaturall Subſtance*. 636

The greater Part of *Trees* beare *Moſt*, and *Beſt*, on the *Lower-Boughes*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But ſome beare *Beſt* on the *Top-Boughes*; As *Crabs*, &c. Thoſe that beare beſt below, are ſuch, as Shade doth more good to, than Hurt. For generally all *Fruits* beare beſt loweſt; Becauſe the *Sap* tireth not, having but a ſhort Way: And therefore in *Fruits* ſpred upon *Walls*, the Loweſt are the Greateſt, as was formerly ſaid; So it is the *Shade* that hindereth the *Lower-Boughes*; Except it be in ſuch *Trees*, as delight in *Shade*; Or at leaſt beare it well. And therefore, they are either Strong *Trees*, as the *Oake*; Or elſe they have large *Leaves*, as the *Wallnut* and *Fig*; Or elſe they grow in *Piramis*, as the *Peare*. But if they require very much *Sunne*, they beare beſt on the *Top*; As it is in *Crabs*, *Apples*, *Plums*, &c. 637

There be *Trees*, that beare beſt, when they begin to bee *Old*; As *Almonds*, *Peares*, *Vines*, and all *Trees* that give *Maſt*. The *Cauſe* is, for that all *Trees*, that beare *Maſt*, have an *Oyly Fruit*; And *Young Trees* have a more *Watry Iuyce*, and leſſe Concocted; And of the ſame kinde alſo is the *Almond*. The *Peare* likewiſe, though it be not *Oylie*, yet it requireth much *Sap*, and well Concocted; For we ſee it is a Heavy *Fruit*, and Solide; Much more than *Apples*, *Plums*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it is *Young*; But *Grapes* that make better *Wine*, when it is *Old*; For that the *Iuyce* is better Concocted: And we ſee, that *Wine* is Inflammable; So as it hath a kinde of *Oylineſſe*. But the moſt Part of *Trees*, amongſt which are *Apples*, *Plums*, &c. beare beſt when they are *Young*. 638

There be *Plants*, that have a *Milke* in them, when they are Cut; As *Figs*, *Old-Lettuce*, *Sow-Thiſtles*, *Spurge*, &c. The *Cauſe* may be an *Inception* of *Putrefaction*; For thoſe *Milkes* have all an *Acrimony*; Though one would thinke they ſhould be *Lenitive*. For if you write upon Paper, with the *Milke* of the *Fig*, the Letters will not be ſeene, untill you hold the Paper before the Fire, & then they wax Brown; which ſheweth that it is a Sharp or Fretting *Iuyce*: *Lettuce* is thought Poyſonous, when it is ſo *Old*, as to have *Milke*; *Spurge* is a kinde of Poyſon in it Selfe; And as for *Sow-Thiſtles*, though Coneyes eate them, yet Sheep and Cattell will not touch them; And beſides, the *Milke* of them, rubbed upon Warts, in ſhort time, weareth them away: Which ſheweth the *Milke* of them to be *Corroſive*. We ſee alſo, that *Wheat*, & other *Corn ſowen*, if you take them forth of the *Ground*, before they ſprout, are full of *Milke*; And the Beginning of *Germination* is ever a Kinde of *Putrefaction* of the *Seed*. *Euphorbium* alſo hath a *Milke*, though not very white, which is of a great *Acrimony*. And *Saladine* hath a yellow *Milke*, which hath likewiſe much *Acrimony*; For it cleanſeth the *Eyes*. It is good alſo for *Cataracts*. 639

Muſhromes are reported to grow, as well upon the *Bodies* of *Trees*, as upon their *Roots*, or upon the *Earth*: And eſpecially upon the *Oake*. The *Cauſe* is, for that ſtrong *Trees*, are towards ſuch *Excreſcences*, in the Nature of *Earth*; And therefore put forth *Moſſe*, *Muſhromes*, and the like. 640

There

641 There is hardly found a *Plant*, that yeeldeth a *Red Iuyce*, in the *Blade*, or *Eare*; Except it bee the *Tree* that beareth *Sanguis Draconis*: Which groweth (chiefly) in the *Iſland Soquotra*: The *Herbe Amaranthus*, (indeed,) is *Red* all over; And *Braſill* is *Red* in the *Wood*: And ſo is *Red Sanders*. The *Tree* of the *Sanguis Draconis*, groweth in the forme of a *Sugar-Loafe*. It is like, the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For we ſee that *Grapes*, and *Pomegranats*, are *Red* in the *Iuyce*, but are *Greene* in the *Teare*: And this maketh the *Tree* of *Sanguis Draconis*, leſſer towards the *Top*; Becauſe the *Iuyce* haſteneth not up; And beſides, it is very *Aſtringent*; And therefore of Slow Motion.

642 It is reported, that *Sweet Moſſe*, beſides that upon the *Apple-Trees*, groweth likewiſe (ſometimes) upon *Poplars*; And yet (generally) the *Poplar* is a Smooth *Tree* of *Barke*, and hath little *Moſſe*. The *Moſſe* of the *Larix Tree* burneth alſo ſweet, and ſparkleth in the Burning. *Quære* of the *Moſſes* of *Odorate Trees*; As *Cedar*, *Cypres*, *Lignum Aloës*, &c.

643 The *Death* that is moſt without Paine, hath beene noted to be, upon the *Taking* of the *Potion* of *Hemlocke*; which in Humanity was the Forme of *Execution* of *Capitall Offenders* in *Athens*. The *Poyſon* of the *Aſpe*, that *Cleopatra* uſed, hath ſome affinity with it. The *Cauſe* is, for that the *Torments* of *Death* are chiefly raiſed by the Strife of the *Spirits*; And theſe *Vapours* quench the *Spirits* by *Degrees*; Like to the *Death* of an extreme Old Man. I conceive it is leſſe Painfull than *Opium*, becauſe *Opium* hath Parts of *Heat* mixed.

644 There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are Sweet before they ripen, and after grow Spicy. And ſome never *Ripen* to be *Sweet*; As *Tamarinds*, *Barberries*, *Crabs*, *Sloes*, &c. The *Cauſe* is, for that the former Kinde have much and ſubtile *Heat*, which cauſeth Early Sweetneſſe; The latter have a *Cold* and *Acide Iuyce*, which no *Heate* of the *Sunne* can ſweeten. But as for the *Mirabolane*, it hath Parts of Contrary *Natures*; For it is *Sweet*, and yet *Aſtringent*.

645 There be few *Herbs* that have a *Salt Taſte*; And contrariwiſe all *Bloud* of *Living Creatures* hath a *Saltineſſe*: The *Cauſe* may bee, for that *Salt*, though it be the *Rudiment* of *Life*, yet in *Plants* the Originall *Taſte* remaineth not; For you ſhall have them *Bitter*, *Sower*, *Sweet*, *Biting*, but ſeldome *Salt*: But in *Living Creatures*, all thoſe High *Taſtes* may happen to be (ſometimes) in the *Humours*, but are ſeldome in the *Fleſh*, or *Subſtance*; Becauſe it is of a more *Oyly Nature*; which is not very Suſceptible of thoſe *Taſtes*; And the *Saltneſſe* it ſelfe of *Bloud*, is but a light, and ſecret *Saltneſſe*: And even among *Plants*, ſome doe participate of *Saltneſſe*, as *Alga Marina*, *Samphire*, *Scorvy-Graſſe*, &c. And they report, there is, in ſome in the *Indian Seas*, a *Swimming Plant*, which they call *Salgazus*, ſpreading over the *Sea*, in ſuch ſort, as one would thinke it were a *Meadow*. It is certaine, that out of the *Aſhes*, of all *Plants*, they extract a *Salt*, which they uſe in *Medicines*.

646 It is reported by one of the *Ancients*, that there is an *Herbe* growing in the *Water*, called *Lincoſtis*, which is full of *Prickles*: This *Herbe* putteth forth another ſmall *Herbe* out of the *Leafe*; which is imputed to ſome *Moiſture*, that is gathered betweene the *Prickles*, which Putrified by the *Sunne*, Germinateth. But I remember alſo I have ſeene, for a great Rarity, one *Roſe* grow out of another, like *Honey-Suckles*, that they call *Top* and *Top-gallants*.

647 *Barley*, (as appeareth in the *Malting*,) being ſteeped in *Water* three dayes, and afterwards the *Water* drained from it, and the *Barley* turned upon a drie floare, will ſprout, halfe an Inch long at leaſt: And if it bee let alone, and not

not turned, much more; untill the Heart be out. *Wheat* will doe the same. Trie it also with *Pease*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-Vive*; For there it is of the old Store, for no *Water* is added; But here it is nourished from the *Water*. The *Experiment* would be further driven: For it appeareth already, by that which hath beene said, that *Earth*, is not necessary to the first Sprouting of *Plants*; And we see that *Rose-Buds* set in *Water*, will Blow: Therefore trie whether the *Sprouts* of such *Graines* may not be raised to a further Degree; As to an *Herbe*, or *Flower*, with *Water* onely; Or some small commixture, of *Earth*: For if they will, it should seeme by the *Experiments* before, both of the *Malt*, and of the *Roses*, that they will come farre faster on in *Water*, than in *Earth*: For the *Nourishment* is easilier drawne out of *Water*, than out of *Earth*. It may give some light also, that *Drink* infused with *Flesh*, as that with the *Capon*, &c. will nourish faster and easilier, than *Meat* and *Drinke* together. Trie the same *Experiment* with *Roots*, as well as with *Graines*: as for Example, take a *Turnip*, and steepe it a while, and then drie it, and see whether it will sprout.

Malt in the *Drenching* will swell; And that in such a manner, as after the Putting forth in Sprouts, and the drying upon the Keele, there will bee gained at least a Bushell in eight, and yet the Sprouts are rubbed off; And there will be a Bushell of *Dust* besides the *Malt*: Which I suppose to be, not onely by the loose, and open Laying of the *Parts*, but by some Addition of *Substance*, drawne from the *Water*, in which it was steeped. 648

Malt gathereth a *Sweetnesse* to the *Taste*, which appeareth yet more in the *Wort*. The *Dulcoration* of *Things* is worthy to be tried to the full; For that *Dulcoration* importeth a degree to *Nourishment*: And the Making of *Things Inalimentall*, to become *Alimentall*, may be an *Experiment* of great Profit, for Making new *Victuall*. 649

Most *Seeds* in the Growing, leave their *Husk* or *Rinde* about the *Root*; But the *Onion* will carry it up, that it will be like a Cap upon the Top of the *Young Onion*. The *Cause* may be, for that the *Skin* or *Huske* is not easie to break; as we see by the Pilling of *Onions*, what a holding *Substance* the *Skin* is. 650

Plants, that have *Curled Leaves*, doe all abound with *Moysture*; Which commeth so fast on, as they cannot spread themselves Plain, but must needs gather together. The Weakest Kinde of *Curling* is *Roughnesse*; As in *Clary*, and *Burre*. The Second is *Curling* on the Sides; As in *Lettuce*, and *Young Cabbage*: And the Third is *Folding* into an *Head*; As in *Cabbage* full growne, and *Cabbage-Lettuce*. 651

It is reported, that *Firre*, and *Pine*, especially if they be *Old* and *Putrified*, though they shine not, as some *Rotten Woods* doe, yet in the sudden *Breaking* they will sparkle like Hard *Sugar*. 652

The *Roots* of *Trees* doe, (some of them,) put downwards deepe into the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some spread more towards the *Surface* of the *Earth*: As the *Ash*, *Cypresse-Tree*, *Olive*, &c. The *Cause* of this latter may be, for that such *Trees* as love the *Sunne*, doe not willingly descend farre into the *Earth*; And therefore they are (commonly) *Trees*, that shoot up much; For in their *Body*, their desire of Approach to the *Sunne*, maketh them spread the lesse. And the same Reason, under *Ground*, to avoid Recesse from the *Sunne*, maketh them spread the more. And we see it commeth to passe in some *Trees*, which have beene planted too deepe in the *Ground*, that for love of Approach to the *Sunne*, they forsake their first *Root*, and put out another more towards the *Top* of the *Earth*. And wee see also, that the *Olive* is full of *Oylie Iuyce*; And *Ash* maketh the best Fire; And 653

Cypreſſe is an *Hot Tree*. As for the *Oake*, which is of the former ſort, it loveth the *Earth*; And therefore groweth ſlowly. And for the *Pine*, and *Firre* likewiſe, they have ſo much *Heat* in themſelves, as they need leſſe the *Heat* of the *Sunne*. There be *Herbs* alſo, that have the ſame difference; As the *Herbe* they call *Morſus Diaboli*; which putteth the *Root* downe ſo low, as you cannot pull it up without *Breaking*; Which gave Occaſion to the *Name*, and *Fable*; For that it was ſaid, it was ſo wholſome a *Root*, that the *Devill*, when it was gathered, bit it for *Envy*: And ſome of the *Ancients* doe report, that there was a goodly *Firre*, (which they deſired to remove whole, that had a *Root* under *Ground* eight Cubits deep; And ſo the *Root* came up broken.

654 It hath beene obſerved, that a *Branch* of a *Tree*, being *Vnbarked* ſome ſpace at the Bottome, and ſo ſet into the *Ground*, hath growen; even of ſuch *Trees*, as if the *Branch* were ſet with the *Barke* on, they would not grow; yet contrariwiſe we ſee, that a *Tree* Pared round in the *Body*, above *Ground*, will die. The *Cauſe* may be, for that the *Vnbarkt Part* draweth the Nouriſhment beſt, but the *Barke* continueth it onely.

655 *Grapes* will continue *Freſh*, and *Moiſt*, all Winter long, if you hang them, *Cluſter* by *Cluſter*, in the *Roofe* of a *Warme Roome*; Eſpecially, if when you gather the *Cluſter*, you take off with the *Cluſter* ſome of the *Stocke*.

656 The *Reed* or *Cane* is a *Watry Plant*, and groweth not but in the *Water*; It hath theſe Properties; That it is *Hollow*; That it is *Knuckled* both *Stalke*, and *Root*; that being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*, That it putteth forth no *Boughs*, though many *Stalks* out of one *Root*. It differeth much in greatneſſe; The ſmalleſt being fit for Thatching of Houſes; And Stopping the Chinkes of Ships; Better than Glew, or Pitch. The Second Bigneſſe, is uſed for Angle-Rods, and Staves; And in *China* for beating of Offenders upon the Thighs. The differing *Kinds* of them are; The *Common Reed*; The *Caſſia Fiſtula*; And the *Sugar-Reed*. Of all *Plants*, it boweth the eaſieſt, and riſeth againe. It ſeemeth, that amongſt *Plants*, which are nouriſhed with *Mixture* of *Earth* and *Water*, it draweth moſt Nouriſhment from *Water*; which maketh it the *Smootheſt* of all others in *Barke*; And the *Holloweſt* in *Body*.

657 The *Sap* of *Trees*, when they are let *Bloud*, is of differing *Natures*. Some more *Watrie* and *Cleare*; As that of *Vines*; of *Beeches*; of *Peares*. Some *Thick*; As *Apples*. Some *Gummy*; as *Cherries*. Some *Froathy*; As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* ſeemeth to be (almoſt) towards the *Barke* onely; For if you cut the *Tree* a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole*, it will bee drie. The *Trees*, which have the *Moiſteſt Iuyces* in their *Fruit*, have commonly the *Moiſteſt Sap* in their *Bodie*; For the *Vines* and *Peares* are very *Moiſt*; *Apples* ſomewhat more *Spongie*: The *Milke* of the *Figge* hath the Qualitie of the *Rennet*, to gather *Cheeſe*: And ſo have certaine *Soure Herbs* wherewith they make *Cheeſe* in *Lent*.

658 The *Timber* and *Wood* are, in ſome *Trees*, more *Cleane*, in ſome more *Knottie*; And it is a good Triall, to trie it by Speaking at one End, and Laying the Eare at the Other: For if it be *Knottie*, the Voice will not paſſe well. Some have the *Veines* more varied and chamloted; As *Oake*, whereof *Wainſcot* is made; *Maple*, whereof *Trenchers* are made: Some more ſmooth, as *Firre* and *Walnut*: Some doe more eaſily breed *Wormes* and *Spiders*; Some more hardly, as it is ſaid of *Iriſh Trees*: Beſides there bee a Number of Differences that concerne their Uſe; As *Oake*, *Cedar*, and *Cheſnut*, are the

the best Builders: Some are best for *Plough-Timber*; As *Ash*; Some for *Peeres*, that are sometimes wet, and sometimes drie; As *Elme*: Some for *Planchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Deskes*; As *Walnuts*: Some for *Ship-Timber*; As *Oakes* that grow in *Moist Grounds*; For that maketh the *Timber* Tough, and not apt to rift with *Ordnance*; Wherein *English* and *Irish Timber* are thought to excell: Some for *Masts* of *Ships*; As *Firre* and *Pine*, because of their Length, Straightnesse, and Lightnesse: Some for *Pale*; As *Oake*: Some for *Fuell*; As *Ash*: And so of the rest.

659 The *Comming* of *Trees* and *Plants* in certaine *Regions*, and not in others, is sometimes *Casuall*: For many have beene translated, and have prospered well; As *Damaske-Roses*, that have not beene knowne in *England* above an hundred yeares, and now are so common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meerely *Naturall*; As the *Firre* and *Pine* love the Mountaines; The *Poplar*, *Willow*, *Sallow*, and *Alder*, love *Rivers*, and *Moist Places*: The *Ash* loveth *Coppices*; But is best in *Standards* alone: *Iuniper* loveth *Chalke*; And so doe most *Fruit-Trees*: *Sampire* groweth but upon *Rockes*: *Reeds* and *Osiers* grow where they are washed with *Water*: The *Vine* loveth Sides of *Hills*, turning upon the *South-East-Sunne*, &c.

660 The *Putting forth* of certaine *Herbs* discovereth of what Nature the *Ground* where they put forth, is: As *Wilde Thyme* sheweth good *Feeding Ground* for *Cattell*: *Bettony* and *Strawberries* shew *Grounds* fit for Wood: *Camomill* sheweth Mellow *Grounds* fit for *Wheat*. *Mustard-Seed*, growing after the *Plough*, sheweth a good *Strong Ground* also for *Wheat*: *Burnet* sheweth good *Meadow*: And the like.

661 There are found, in divers *Countries*, some other *Plants*, that grow out of *Trees*, and *Plants*, besides *Misseltoe*: As in *Syria*, there is an *Herb* called *Cassytas*, that groweth out of tall *Trees*, and windeth it selfe about the same *Tree* where it groweth; And sometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewise an *Herbe* called *Faunor*, upon the *Wilde Olive*. And an *Herbe* called *Hippophæston* upon the *Fullers Thorne*; Which, they say, is good for the *Falling-Sickenesse*.

662 It hath bin observed, by some of the *Ancients*, that howsoever *Cold* and *Easterly Winds*, are thought to be great Enemies to *Fruit*; yet nevertheless *South-Winds* are also found to doe Hurt; Especially in the *Blossoming* time; And the more, if *Showers* follow. It seemeth, they call forth the *Moisture* too fast. The *West Winds* are the best. It hath been observed also, that *Greene* and *Open Winters* doe hurt *Trees*; Insomuch as if two or three such *Winters* come together, *Almond-Trees*, and some other *Trees*, will die. The *Cause* is the same with the former, because the *Lust* of the *Earth* overspendeth it selfe; Howsoever some other of the *Ancients* have commended *Warme Winters*.

663 *Snowes*, lying long, cause a *Fruitfull Yeare*; For first, they keepe in the *Strength* of the *Earth*; Secondly, they water the *Earth*, better than *Raine*; For in *Snow*, the *Earth* doth (as it were) sucke the *Water*; as out of the *Teat*. Thirdly, the *Moisture* of *Snow* is the finest *Moisture*; For it is the *Froth* of the *Cloudy Waters*.

664 *Showers*, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moist Fruits*; As *Vines*, *Olives*, *Pomegranates*; Yet it is rather for Plenty, than for Goodnesse; For the best *Wines* are in the Driest *Vintages*: *Small Showers* are likewise good for *Corne*, so as *Parching Heats* come not upon them. Generally, *Night-Showers* are better than *Day-Showers*;

Showers; For that the *Sunne* followeth not so fast upon them: and wee see, even in *Watring* by the *Hand*, it is best, in *Summer time*, to water in the *Evening*.

665 The *Differences* of *Earths*, and the *Triall* of them, are worthy to bee diligently inquired. The *Earth*, that with *Showers* doth easilie*st Soften*, is commended; And yet some *Earth* of that kinde will be very Drie, and Hard before the *Showers*. The *Earth* that casteth up from the *Plough*, a great *Clod*, is not so good, as that, which casteth up a Smaller *Clod*. The *Earth*, that putteth forth *Mosse* easily, and may be called *Mouldie*, is not good. The *Earth*, that smelleth well upon the Digging, or Ploughing, is commended; As containing the *Iuyce* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Raine-bowes*, fall more upon one kinde of *Earth* than upon another: As it may well be; For that the *Earth* is most *Roscide*: And therefore it is commended for a Signe of good *Earth*. The *Poorenesse* of the *Herbs*, (it is plaine,) shew the *Poorenesse* of the *Earth*; And especially if they be in *Colour* more darke: But if the *Herbs* shew *Withered*, or *Blasted* at the Top, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossinesse* of *Trees*. The *Earth*, whereof the *Grasse* is soone *Parched* with the *Sunne*, and *Toasted*, is commonly *Forced Earth*, and Barren in his owne Nature. The *Tender*, *Chessome*, and *Mellow Earth*, is the best; Being meere *Mould*, between the two Extreames of *Clay*, and *Sand*; Especially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will scarce be *Ploughed*, is commonly *Fruitfull*; For it is *Cleaving*, and full of *Iuyce*.

666 It is strange, which is observed by some of the *Ancients*, that *Dust* helpeth the *Fruitfulnesse* of *Trees*; and of *Vines*, by name: Insomuch as they cast Dust upon them of purpose. It should seeme, that that Powdring, when a Shower commeth, maketh a kinde of Soyling to the *Tree*, being *Earth* and *Water*, finely laid on. And they note, that Countries, where the *Fields* and *Wayes* are *Dusty*, beare the best *Vines*.

667 It is commended by the *Ancients*, for an Excellent *Helpe* to *Trees*, to lay the *Stalkes*, and *Leaves* of *Lupines* about the *Roots*; Or to Plough them into the *Ground*, where you will sow *Corne*. The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them upon *land*, doth much Good. And it was generally received of old, that *Dunging* of *Grounds*, when the *West Winde* bloweth, and in the *Decrease* of the *Moone*, doth greatly helpe; The *Earth* (as it seemeth) being then more thirsty, and open, to receive the *Dung*.

668 The *Grafting* of *Vines* upon *Vines*, (as I take it,) is not now in use: The *Ancients* had it, and that three wayes: The first was *Insition*, which is the Ordinary manner of *Grafting*: The Second was *Terebration*, through the *Middle* of the *Stocke*, and putting in the *Cions* there: And the Third was Paring of two *Vines*, that grow together, to the *Marrow*, and Binding them close.

669 The *Diseases* and ill *Accidents* of *Corne*, are worthy to be enquired; And would be more worthy to be enquired, if it were in Mens Power to helpe them; Whereas many of them are not to be remedied. The *Mill-dew* is one of the Greatest; which (out of question) commeth by *Closenesse* of *Aire*; And therefore in *Hills*, or large *Champaigne Grounds*, it seldome commeth; Such as is with us *York's Woald*. This cannot bee remedied, otherwise than that in *Countries* of small Enclosure, the *Grounds* bee turned into larger *Fields*: Which I have knowne to doe good in some Farmes. Another *Disease* is the *Putting forth* of *Wilde Oates*, whereinto *Corne* oftentimes, (especially *Barley*,) doth degenerate. It happeneth chiefly from the

the *Weakneſſe* of the *Graine* that is ſowen; For if it bee either too Old, or Mouldy, it will bring forth *Wilde Oats*. Another *Diſeaſe* is the *Saçietie* of the *Ground*; For if you ſow one *Ground* ſtill with the ſame *Corne*, (I meane not the ſame *Corne* that grew upon the ſame *Ground*,) but the ſame *Kinde* of *Graine*; (As *Wheat*, *Barley*, &c.) it will proſper but poorely: Therefore beſides the *Reſting* of the *Ground*, you muſt vary the *Seed*. Another ill *Accident* is, from the *Winds*, which hurt at two times; At the *Flowring*, by *ſhaking* off the *Flowers*; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Accident* is, *Drouth*, at the *Spindling* of the *Corne*; Which with us is rare; But in Hotter *Countries*, common: Inſomuch as the Word, *Calamitas*, was firſt derived from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Over-wet* at *Sowing-Time*; which with us breedeth much *Dearth*; Inſomuch as the *Corne* never commeth up; And (many times) they are forced to reſow *Sommer-Corne*, where they ſowed *Winter-Corne*. Another ill *Accident* is *Bitter Froſts*, continued, without *Snow*; Eſpecially in the Beginning of the *Winter*, after the *Seed* is new Sowen. Another *Diſeaſe* is *Wormes*; which ſometimes breed in the *Root*, and happen upon Hot *Sunnes*, and *Showres*, immediately after the *Sowing*; And another *Worme* breedeth in the *Eare* it Selfe; Eſpecially when *Hot Sunnes* breake often out of *Clouds*. Another *Diſeaſe* is *Weeds*; And they are ſuch, as either Choak, and Over-ſhadow the *Corne*, and beare it downe; Or ſtarve the *Corne*, and deceive it of Nouriſhment. Another *Diſeaſe* is, *Over-Rankneſſe* of the *Corne*; Which they uſe to remedy, by *Mowing it* after it is come up; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neare, or in *Harveſt*. Another ill *Accident* is, if the *Seed* happen to have touched *Oyle*, or any *Thing*, that is *Fat*; For thoſe *Subſtances* have an *Antipathy* with *Nouriſhment* of *Water*.

The *Remedies* of the *Diſeaſes* of *Corne* have beene obſerved as followeth. 670
The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preſervative*: The *Mingling* of *Seed-Corne* with *Aſhes*, is thought to be good: The *Sowing* at the *Wane* of the *Moone*, is thought to make the *Corne* ſound: It hath not beene practiſed, but it is thought to bee of uſe, to make ſome *Miſſellane* in *Corne*; As if you ſow a few *Beanes* with *Wheat*, your *Wheat* will be the bettet. It hath beene obſerved, that the *Sowing* of *Corne* with *Houſleeke*, doth good. Though *Graine*, that toucheth *Oyle*, or *Fat*, receiveth hurt, yet the *Steeping* of it, in the *Dregs* of *Oyle*, when it beginneth to Putrifie, (which they call *Amurca*,) is thought to aſſure it againſt *Wormes*. It is reported alſo, that if *Corne* bee *Mowed*, it will make the *Graine* Longer, but Emptier, and having more of the *Huske*.

It hath beene noted, that *Seed* of a yeare old, is the Beſt; And of two or 671
three yeares is worſe; And that which is more Old, is quite Barren; Though (no doubt) ſome *Seed* and *Graines* laſt better than others. The *Corne*, which in the *Vanning* lieth loweſt, is the beſt: And the *Corne*, which broken or bitten retaineth a little *Yellowneſſe*, is better than that which is very *White*.

It hath beene obſerved, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth 672
the furtheſt into the *Earth*; Inſomuch as it hath beene knowne to goe three Cubits deep; And that it is the *Root* that continueth fit (longeſt) to be ſet againe, of any *Root* that groweth. It is a *Cold*, and *Acide Herb*, that (as it ſeemeth) loveth the *Earth*, and is not much drawne by the *Sunne*.

It hath beene obſerved, that ſome *Herbs* like beſt, being watred with 673
Salt-Water; And *Radiſh*, *Beet*, *Rew*, *Pennyroyall*; This Triall would be extended

to some other *Herbs*; Especially such as are Strong; As *Tarragon*, *Mustard-Seed*, *Rocket*, and the like.

674 It is strange that is generally received, how some *Poysonous Beasts* affect *Odorate* and *Wholsome Herbs*; As that the *Snake* loveth *Fennell*; That the *Toad* will be much under *Sage*; That *Frogs* will be in *Cinquefoile*. It may be, it is rather the *Shade*, or other Coverture, that they take liking in, than the Vertue of the *Herb*.

675 It were a Matter of great Profit, (save that I doubt it is too Conjecturall to venture upon,) if one could discerne, what *Corne*, *Herbs*, or *Fruits*, are like to be in *Plenty*, or *Scarcity*, by some *Signes* and *Prognosticks*, in the Beginning of the Yeare: For as for those, that are like to be in *Plenty*, they may be bargained for, upon the *Ground*; As the Old Relation was of *Thales*; who to shew how easie it was for a *Philosopher* to be rich, when he fore-saw a great *Plenty* of *Olives*, made a *Monopoly* of them. And for *Scarcitie*, Men may make Profit in keeping better the Old Store. Long *Continuance* of *Snow* is beleeved to make a *Fruitfull Yeare* of *Corn*: An *Early Winter*, or a very *Late Winter*, a *Barren Yeare* of *Corne*: An Open and Serene *Winter*, an ill Yeare of *Fruit*: These we have partly touched before: But other *Prognosticks* of like Nature are diligently to be enquired.

676 There seeme to be, in some *Plants*, *Singularities*, wherein they differ from all Other; The *Olive* hath the *Oyly Part*, onely on the *Outside*; Whereas all other *Fruits* have it in the *Nut*, or *Kernell*. The *Firre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines Kernells*. The *Pomegranate* and *Pine-Apple* have onely, amongst *Fruits*, *Graines* distinct in severall *Cells*. No *Herbs* have *Curled Leaves*, but *Cabbage*, and *Cabbage-Lettuce*. None have double *Leaves*, one belonging to the *Stalk*, another to the *Fruit* or *Seed*, but the *Artichoke*: No *Flower* hath that kind of Spread that the *Woodbine* hath. This may be a large Field of Contemplation; For it sheweth that in the Frame of *Nature*, there is, in the Producing of some *Species*, a Composition of Matter, which happeneth oft, and may be much diversified: In others, such as happeneth rarely, and admitteth little Variety: for so it is likewise in *Beasts*: *Dogs* have a Resemblance with *Wolves*, and *Foxes*; *Horses* with *Asses*; *Kine* with *Bufles*; *Hares* with *Coneys*; &c. And so in *Birds*: *Kites* and *Kestrels* have a Resemblance with *Hawkes*; *Common-Doves* with *Ring-Doves*, and *Turtles*; *Black-Birds* with *Thrushes*, and *Mavisses*; *Crowes* with *Ravens*, *Dawes*, and *Choughes*, &c. But *Elephants*, and *Swine* amongst *Beasts*; And the *Bird* of *Paradise*, and the *Peacocke* amongst *Birds*; And some few others; have scarce any other *Species*, that have Affinity with them.

Wee leave the *Description* of *Plants*, and their *Vertues*, to *Herballs*, and other like *Bookes* of *Naturall History*: Wherein *Mens Diligence* hath beene great, even to *Curiositie*: For our *Experiments* are onely such, as doe ever ascend a Degree to the *Deriving* of *Causes*, and *Extracting* of *Axiomes*, which, we are not ignorant, but that some, both of the *Ancient*, and *Moderne Writers*, have also laboured; But their *Causes*, and *Axiomes*, are so full of Imagination, and so infected with the old Received *Theories*, as they are meere *Inquinations* of *Experience*, and Concoct it not.

It

Experiment Solitary, touching *Healing* of *Wounds*. 677

IT hath beene obſerved, by ſome of the *Ancients*, that *Skins*, (eſpecially of *Rammes*,) newly pulled off, and applyed to the *Wounds* of *Stripes*, doe keepe them from Swelling, and Exulcerating; And likewiſe Heale them, and Cloſe them up; And that the *Whites* of *Egges* doe the ſame. The *Cauſe* is a Temperate *Conglutination*; For both *Bodies* are Clammy, and Viſcous, and doe bridle the *Defluxe* of *Humours* to the Hurts, without Penning them in too much.

Experiment Solitary touching *Fat diffuſed* in *Fleſh*. 678

YOu may turne (almoſt) all *Fleſh* into a *Fatty Subſtance*, if you take *Fleſh*, and cut it into Peeces, and put the Peeces into a *Glaſſe* covered with Parchment; And ſo let the *Glaſſe* ſtand ſix or ſeven Houres in *Boyling Water*. It may bee an *Experiment* of Profit, for Making of *Fat*, or *Greaſe*, for many uſes; But then it muſt be of ſuch *Fleſh* as is not Edible; As *Horſes*, *Dogs*, *Beares*, *Foxes*, *Badgers*, &c.

Experiment Solitary, touching *Ripening* of *Drinke* before the *Time*. 679

IT is reported by one of the *Ancients*, that *New Wine*, put into *Veſſels* well ſtopped, and the *Veſſells* let downe into the *Sea*, will accelerate very much, The Making of them Ripe, and Potable. The ſame would be tried in *Wort*.

Experiment Solitary touching *Piloſity* and *Plumage*. 680

Beaſts are more *Hairy* than *Men*; And *Savage Men* more than *Civill*; And the *Plumage* of *Birds* exceedeth the *Piloſitie* of *Beaſts*. The *Cauſe* of the Smoothneſſe in *Men*, is not any Abundance of *Heat*, and *Moiſture*, though that indeed cauſeth *Piloſitie*; But there is requiſite to *Piloſity*, not ſo much *Heat* and *Moiſture*, as *Excrementitious Heat* and *Moiſture*: (For whatſoever aſſimilateth, goeth not into the *Haire*:) And *Excrementitious Moiſture* aboundeth moſt in *Beaſts*, and *Men* that are more *Savage*. Much the ſame Reaſon is there of the *Plumage* of *Birds*; For *Birds* aſſimilate leſſe, and excerne more than *Beaſts*: for their *Excrements* are ever liquid and their *Fleſh* (generally) more drie: Beſide, they have not *Inſtruments* for *Vrine*; And ſo all the *Excrementitious Moyſture* goeth into the *Feathers*: And therefore it is no Marvell, though *Birds* bee commonly better Meat than *Beaſts*, becauſe their *Fleſh* doth aſſimilate more finely, and ſecerneth more ſubtilly. Againe, the *Head* of *Man* hath *Haire* upon the *firſt Birth*, which no other *Part* of the *Body* hath. The *Cauſe* may be *Want* of *Perſpiration*: For Much of the Matter of *Haire*, in the other *Parts* of the *Body*, goeth forth by Inſenſible *Perſpiration*; And beſides, the *Skull* being of a more ſolide Subſtance, nouriſheth and aſſimilateth leſſe, and excerneth more: And ſo likewiſe doth the *Chinne*; We ſee alſo that *Haire* commeth not upon the *Palmes* of the *Hands*, nor *Soales* of the *Feet*; Which are *Parts* more *Perſpirable*. And *Children* likewiſe are not *Hairy*, for that their *Skins* are more *Perſpirable*.

Experiments Solitary, touching the *Quickneſſe* of *Motion* in *Birds*. 681

Birds are of *Swifter Motion* than *Beaſts*: For the *Flight* of many *Birds* is *Swifter*, than the *Race* of any *Beaſts*. The *Cauſe* is, for that the *Spirits* in *Birds*, are in greater Proportion, in compariſon of the Bulke of their Body, than in *Beaſts*: For as for the Reaſon that ſome give, that they are partly Carried, whereas *Beaſts* goe, that is Nothing; For by that Reaſon Swimming ſhould be ſwifter, than Running: And that Kinde of *Carriage* alſo, is not without Labour of the *Wing*.

Experiment Solitary, touching the different *Clearneſſe* of the *Sea*. 682

THe *Sea* is *Clearer*, when the *North-Wind* bloweth, than when the *South-Wind*. The *Cauſe* is, for that *Salt-Water* hath a little *Oylineſſe* in the *Surface* thereof; As appeareth in very Hot Dayes: And againe, for that the

Southerne

Southerne Wind relaxeth the *Water* somewhat; As no *Water Boyling* is so Cleare as *Cold Water*.

Experiment Solitary, touching the different *Heats* of *Fire* and *Boyling Water*. 683

Fire burneth *Wood*, making it first *Luminous*; Then *Black* and *Brittle*; And lastly, *Broken* and *Incinerate*: *Scalding Water* doth none of these. The *Cause* is, for that by *Fire*, the *Spirit* of the *Body* is first *Refined*, and then *Emitted*; Whereof the *Refining*, or Attenuation causeth the *Light*; And the *Emission*, first the *Fragilitie*, and after the *Dissolution* into *Ashes*: Neither doth any other *Body* enter: But in *Water* the *Spirit* of the *Body* is not *Refined* so much; And besides Part of the *Water* entreth; Which doth increase the *Spirit*, and in a degree extinguish it: Therefore wee see that *Hot Water* will quench *Fire*. And againe we see, that in *Bodies*, wherein the *Water* doth not much enter, but onely the *Heat* passeth, *Hot Water* worketh the Effects of *Fire*: As in *Egges Boyled*, and *Roasted*, (into which the *Water* entreth not at all,) there is scarce difference to be discerned; But in *Fruit*, and *Flesh*, whereinto the *Water* entreth, in some Part, there is much more difference.

Experiment Solitary, touching the *Qualification* of *Heat* by *Moysture*. 684

THe *Bottome* of a *Vessell* of *Boyling Water*, (as hath beene observed,) is not very much *Heated*, So as Men may put their *Hand* under the *Vessel*, and remove it. The *Cause* is, for that the *Moisture* of *Water*, as it quencheth Coales, where it entreth; So it doth allay Heat, where it toucheth: And therefore note well, that *Moisture*, although it doth not passe thorow *Bodies*, without *Communication* of some *Substance*, (As *Heat* and *Cold* doe;) yet it worketh manifest Effects; not by Entrance of the Body, but by Qualifying of the Heat, and Cold; As we see in this *Instance*: And we see likewise, that the *Water* of *Things distilled* in *Water*, (which they call the *Bath*) differeth not much from the *Water* of *Things Distilled* by *Fire*: We see also, that *Pewter-Dishes*, with *Water* in them, will not Melt easily; But without it, they will; Nay we see more, that *Butter*, or *Oile*, which in themselves are Inflammable, yet by the Vertue of their *Moisture*; will doe the like.

Experiment Solitary, touching *Yawning*. 685

IT hath beene noted by the *Ancients*, that it is dangerous to Picke ones *Eare*, whilest he *Yawneth*. The *Cause* is, for that in *Yawning*, the Inner *Parchment* of the *Eare* is extended, by the *Drawing* in of the *Spirit*, and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is first strongly Drawne in, and then strongly Expelled.

Experiment Solitary, touching the *Hiccough*. 686

IT hath beene observed by the *Ancients*, that *Sneezing* doth cease the *Hiccough*. The *Cause* is, for that the *Motion* of the *Hiccough* is a *Lifting up* of the *Stomacke*; which *Sneezing* doth somewhat depresse, and divert the *Motion* another way. For first we see, that the *Hiccough* commeth of *Fulnesse* of *Meat*, (especially in *Children*,) which causeth an Extension of the *Stomacke*: Wee see also, it is caused by *Acide Meats*, or *Drinkes*, which is by the *Pricking* of the *Stomack*: And this *Motion* is ceased either by *Diversion*; Or by *Detention* of the *Spirits*: *Diversion*, as in *Sneezing*; *Detention*, as wee see *Holding* of the *Breath*, doth helpe somewhat to cease the *Hiccough*: And putting a Man into an Earnest Study doth the like: As is commonly used: And *Vinegar* put to the *Nostrils*, or *Gargarized*, doth it also; For that it is *Astringent*, and inhibiteth the *Motion* of the *Spirit*.

Experiment Solitary, touching *Sneezing*. 687

Looking against the *Sunne*, doth induce *Sneezing*. The *Cause* is, not the *Heating* of the *Nostrils*; For then the holding up of the *Nostrils* against the

the *Sunne*, though one Winke, would doe it; But the *Drawing* downe of the *Moisture* of the *Brain*: For it will make the *Eyes* runne with *Water*; And the *Drawing* of *Moisture* to the *Eyes*, doth draw it to the *Nosthrills*, by *Motion* of *Consent*; And so followeth *Sneezing*; As contrariwise, the *Tickling* of the *Nosthrills* within, doth draw the *Moisture* to the *Nosthrils*, and to the *Eyes* by *Consent*; For they also will *Water*. But yet, it hath beene observed, that if one be about to *Sneeze*, the Rubbing of the *Eyes*, till they runne with Water, will prevent it. Whereof the *Cause* is, for that the *Humour*, which was descending to the *Nosthrils*, is diverted to the *Eyes*.

Experiment Solitary, touching the *Tenderneſſe* of the *Teeth*. 688

THe *Teeth* are more, by *Cold Drinke*, or the like, affected, than the other *Parts*. The *Cause* is double, The One, for that the *Resistance* of *Bone* to *Cold*, is greater than of *Flesh*; for that the *Flesh* shrinketh, but the *Bone* resisteth, whereby the *Cold* becommeth more eager: The Other is, for that the *Teeth*, are *Parts* without *Bloud*; Whereas *Bloud* helpeth to qualifie the *Cold*: And therefore we see, that the *Sinewes* are much affected with *Cold*; For that they are *Parts* without *Bloud*: So the *Bones* in Sharpe *Colds* waxe *Brittle*: And therefore it hath been seene, that all *Contusions* of *Bones*, in *Hard Weather*, are more difficult to Cure.

Experiments Solitary, touching the *Tongue*. 689

IT hath beene noted, that the *Tongue* receiveth, more easily, *Tokens* of *Diseases*, than the other *Parts*; As of *Heats* within, which appeare most in the *Blackneſſe* of the *Tongue*. Againe, *Pied Cattell* are spotted in their *Tongues*, &c. The *Cause* is, (no doubt,) the *Tenderneſſe* of the *Part*, which thereby receiveth more easily all *Alterations*, than any other *Parts* of the *Flesh*.

Experiment Solitary touching the *Taste*. 690

WHen the *Mouth* is out of *Taste*, it maketh Things taste, sometimes *Salt*; Chiefely *Bitter*; And sometimes *Loathsome*; But never *Sweet*. The *Cause* is, the *Corrupting* of the *Moisture* about the *Tongue*; Which many times turneth *Bitter*, and *Salt*, and *Loathsome*; But *Sweet* never; For the rest are *Degrees* of *Corruption*.

Experimene Solitary, touching some *Prognosticks* of *Pestilentiall Seasons*. 691

IT was observed in the *Great Plague* of the last Yeare, that there were seene, in divers *Ditches*, and low *Grounds*, about *London*, many *Toads*, that had *Tailes*, two or three Inches long, at the least; Whereas *Toads* (usually) have no *Tailes* at all. Which argueth a great Disposition to *Putrefaction* in the *Soile* and *Aire*. It is reported likewise, that *Roots*, (such as *Carrets*, and *Parsnips*,) are more *Sweet*, and *Lushious*, in Infectious Yeares, than in other Yeares.

Experiment Solitary, touching *Speciall Simples* for *Medicines*. 692

WIse *Physitians* should with all diligence inquire, what *Simples* Nature yeeldeth, that have extreme *Subtile Parts*, without any *Mordication*, or *Acrimony*: For they undermine that which is *Hard*; They open that which is *Stopped*, and *Shut*; And they expell that which is *Offensive*, gently, without too much *Perturbation*. Of this Kind are *Elder-Flowers*, which therefore are Proper for the *Stone*: Of this Kinde is the *Dwarfe-Pine*; which is Proper for the *Iaundies*: Of this Kinde is *Harts-Horne*: which is Proper for *Agues*, and *Infections*: Of this Kinde is *Piony*; which is Proper for *Stoppings* in the *Head*: Of this Kinde is *Fumitory*; which is Proper for the *Spleen*: And a Number of others. Generally, divers *Creatures* bred of *Putrefaction*, though they be somewhat loathsome to take, are of this kinde; As *Earth-Wormes*, *Timber-Sowes*, *Snailes*, &c. And I conceive, that the *Trochiſchs* of *Vipers*, (which are so much magnified,) and the *Flesh* of *Snakes* some wayes condited,

condited, and corrected, (which of late are growne into some Credite,) are of the same Nature. So the *Parts* of *Beasts Putrified*; (as *Castoreum*, and *Musk*, which have extreme *Subtill Parts*,) are to be placed amongst them. We see also that *Putrefaction* of *Plants*, (as *Agaricke*, and *Iewes-Eare*,) are of greatest Vertue. The *Cause* is, for that *Putrefaction* is the Subtilest of all *Motions*, in the *Parts* of *Bodies*: And since we cannot take downe the *Lives* of *Living Creatures*, (which some of the *Paracelsians* say (if they could bee taken downe,) would make us *Immortall*;) the Next is for *Subtilitie* of *Operation*, to take *Bodies Putrefied*; Such as may be safely taken.

Experiments in Consort, touching *Venus*.

693 IT hath beene observed by the *Ancients*, that *Much Vse* of *Venus* doth *Dim* the *Sight*; And yet *Eunuchs*, which are unable to generate are (nevertheless) also *Dimme-Sighted*. The *Cause* of *Dimnesse* of *Sight*, in the Former, is the *Expence* of *Spirits*: In the Later, the *Over-moisture* of the *Braine*: For the *Over-Moisture* of the *Braine* doth thicken the *Spirits Visuall*, and obstructeth their Passages; As we see by the Decay, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurreth as another *Cause*: wee see also that *Blindnesse* commeth by *Rheumes*, and *Cataracts*. Now in *Eunuchs*, there are all the Notes of *Moisture*; As the Swelling of their Thighes, the Loosenesse of their Belly, the Smoothnesse of their Skinne, &c.

694 The *Pleasure* in the *Act* of *Venus*, is the greatest of the *Pleasures* of the *Senses*; The Matching of it with *Itch* is unproper; though that also be Pleasing to the touch. But the *Causes* are Profound. First, all the *Organs* of the *Senses* qualifie the *Motions* of the *Spirits*; And make so many Severall *Species* of *Motions*, and *Pleasures* or *Displeasures* thereupon, as there be *Diversities* of *Organs*. The *Instruments* of *Sight*, *Hearing*, *Taste*, and *Smell*, are of severall frame; And so are the Parts for Generation. Therefore *Scaliger* doth well, to make the *Pleasure* of *Generation* a *Sixth Sense*; And if there were any other differing *Organs*, & Qualified *Perforations*, for the *Spirits* to passe; there would be more than the *Five Senses*: Neither doe wee well know, whether some *Beasts* and *Birds*, have not *Senses* that we know not; And the very *Sent* of *Dogs* is almost a *Sense* by it selfe. Secondly, the *Pleasures* of the *Touch*, are greater and deeper, than those of the other *Senses*; As we see in *Warming* upon *Cold*; Or *Refrigeration* upon *Heat*: For as the *Paines* of the *Touch*, are greater than the *Offences* of other *Senses*; So likewise are the *Pleasures*. It is true, that the *Affecting* of the *Spirits immediately*, and (as it were) without an *Organ*, is of the greatest *Pleasure*; Which is but in two things: *Sweet Smells*; And *Wine*, and the like *Sweet Vapours*. For *Smells*, we see their great and sudden Effect in fetching *Men* againe, when they swoune: For *Drinke*, it is certaine, that the *Pleasure* of *Drunkennesse*, is next the *Pleasure* of *Venus*: And *Great Ioyes* (likewise) make the *Spirits* move, and touch themselves: And the *Pleasure* of *Venus* is somewhat of the same Kinde.

695 It hath been alwayes observed, that *Men* are more inclined to *Venus* in the *Winter*, and *Women* in the *Summer*. The *Cause* is, for that the *Spirits*, in a *Body* more Hot and Drie, (as the *Spirits* of *Men* are,) by the *Summer* are more exhaled, and dissipated; And in the *Winter* more condensed, and kept entire: But in *Bodies* that are Cold and Moist, (as *Womens* are,) the *Summer* doth Cherish the *Spirits*, and calleth them forth; the *Winter* doth dull them. Furthermore, the *Abstinence*, or *Intermission* of the use of *Venus*, in *Moist* and *well habituate Bodies*, breedeth a *Number* of *Diseases*; And especially dangerous *Impostumations*. The Reason is evident; For that it is a Principall *Evacuation*, especially of the *Spirits*: For of the *Spirits*, there is scarce any *Evacuation*, but

but in *Venus*, and *Exercise*. And therefore the *Omission* of either of them, breedeth all *Diseases* of *Repletion*.

Experiments in Consort, touching the *Insecta*.

The *Nature* of *Vivification* is very worthy the Enquiry: And as the *Nature* of *Things*, is commonly better perceived, in Smal, than in Great; and in unperfect, than in perfect; and in Parts, than in whole: So the *Nature* of *Vivification* is best enquired in *Creatures* bred of *Putrefaction*. The *Contemplation* whereof hath many *Excellent Fruits*. First, in *Discloſing* the *Originall* of *Vivification*. Secondly, in *Discloſing* the *Originall* of *Figuration*. Thirdly, in *Discloſing* many *Things* in the *Nature* of *Perfect Creatures*, which in them lie more hidden. And Fourthly, in *Traducing*, by way of *Operation*, ſome *Obſervations* in the *Inſecta*, to work *Effects* upon *Perfect Creatures*. Note that the word *Inſecta* agreeth not with the Matter, but we ever uſe it for Brevities ſake, intending by it *Creatures bred of Putrefaction*.

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The *Inſecta* are found to breed out of ſeverall *Matters*: Some breed of *Mud*, or *Dung*; As the *Earth-wormes*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth Putrifie, as not able to Preſerve it ſelf: And for *Dung*, all *Excrements* are the *Refuſe* and *Putrefactions* of *Nouriſhment*. Some breed in *Wood*, both Growing, and Cut downe. *Quære* in what *Woods* moſt, and at what Seaſons? We ſee that the *Wormes* with many Feet, which round themſelves into Balls, are bred chiefly under *Logs* of *Timber*, but not in the *Timber*; And they are ſaid to bee found alſo, (many times,) in *Gardens*, where no *Logs* are. But it ſeemeth their *Generation* requireth a *Coverture*, both from *Sunne*, and *Raine*, or *Dew*; As the *Timber* is; And therefore they are not *Venomous*, but (contrariwiſe) are held by the *Phyſitians* to clarifie the *Bloud*. It is obſerved alſo that *Cimices* are found in the *Holes* of *Bed-Sides*. Some breed in the *Haire* of *Living Creatures*; As *Lice*, and *Tikes*; which are bred by the *Sweat* cloſe kept, and ſomewhat arefied by the *Haire*. The *Excrements* of *Living Creatures*, doe not onely breed *Inſecta*, when they are Excerned, but alſo while they are in the *Body*; As in *Wormes* whereto Children are moſt ſubject, and are chiefly in the Guts. And it hath beene lately obſerved by *Phyſitians*, that in many *Peſtilent Diſeaſes*, there are *Wormes* found in the upper Parts of the Body, where *Excrements* are not, but onely *Humours Putrified*. *Fleas* breed principally of *Straw* or *Mats*, where there hath beene a little *Moiſture*; Or the *Chamber* and *Bed-ſtraw* kept cloſe, and not Aired. It is received that they are killed by Strewing *Worme-wood* in the *Rooms*. And it is truely obſerved, that *Bitter Things* are apt, rather to kill, than engender *Putrefaction*; And they be *Things* that are *Fat*, or *Sweet*, that are apteſt to *Putrifie*. There is a *Worme*, that breedeth in *Meale*, of the ſhape of a large white *Maggot*, which is given as a great dainty to *Nightingales*. The *Moath* breedeth upon *Cloth*, and other *Lanifices*; Eſpecially if they be laid up dankiſh, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *Worme* called a *Wevill*, bred under *Ground*, and that feedeth upon *Roots*; As *Parſnips*, *Carrets*, &c. Some breed in *Waters*, eſpecially ſhaded, but they muſt be *Standing Waters*; As the *Water-Spider*, that hath ſix Legs. The *Flie* called the *Gad-flie*, breedeth of ſomewhat that Swimmeth upon the Top of the *Water*, and is moſt about *Ponds*. There is a *Worme* that breedeth of the *Dregs* of

of *Wine Decayed*; which afterwards, (as is observed by some of the *Ancients*,) turneth into a *Gnat*. It hath beene observed by the *Ancients*, that there is a *Worme* that breedeth in old *Snow*, and is of Colour Reddish, and dull of Motion, and dyeth soone after it commeth out of *Snow*. Which should shew, that *Snow* hath in it a secret *Warmth*; For else it could hardly Vivifie. And the Reason of the Dying of the *Worme*, may be the sudden Exhaling of that little *Spirit*, as soon as it commeth out of the *Cold*, which had shut it in. For as *Butterflies* quicken with *Heat*, which were benummed with *Cold*; So *Spirits* may exhale with *Heat*, which were Preserved in *Cold*. It is affirmed both by the *Ancient* and *Moderne Observation*, that in *Furnaces* of *Copper*, and *Brasse*, where *Chalcites*, (which is *Vitrioll*,) is often cast in, to mend the working, there riseth suddenly a *Flie*, which sometimes moveth, as if it tooke hold on the walls of the *Furnace*; Sometimes is seene moving in the *Fire* below; And dieth presently, as soone as it is out of the *Furnace*. Which is a Noble *Instance*, and worthy to be weighed; for it sheweth that as well *Violent Heat* of *Fire*, as the *Gentle Heat* of *Living Creatures*, will Vivifie, if it have Matter Proportionable. Now the great *Axiome* of *Vivification* is, that there must bee *Heat* to dilate the *Spirit* of the *Body*; An *Active Spirit* to be dilated; *Matter Viscous* or *Tenacious*, to hold in the *Spirit*; And that *Matter* to be *put forth*, and *Figured*. Now a *Spirit* dilated by so ardent a *Fire*, as that of the *Furnace*, as soone as ever it cooleth never so little, congealeth presently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will put forth and germinate, as we see in *Chymicall* Trials. Briefly, most *Things Putrified* bring forth *Insecta* of severall Names; But wee will not take upon us now, to Enumerate them all.

697 The *Insecta* have been noted by the *Ancients*, to feed little: But this hath not beene diligently observed; For *Grashoppers* eat up the *Greene* of whole *Countries*; And *Silke-Wormes* devoure *Leaves* swiftly; And *Ants* make great Provision. It is true, that *Creatures*, that Sleep and rest much, Eat little; As *Dormise*, and *Bats*, &c. They are all without *Bloud*: Which may be, for that the *Iuyce* of their *Bodies*, is almost all one; Not *Bloud*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integrall Parts* have Extreme Varietie, but the *Similar Parts* little. It is true, that they have, (some of them,) a *Diaphragme*, and an *Intestine*; And they have all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of *long Life*: Yet *Bees* have beene knowne to live seven yeares: And *Snakes* are thought, the rather for the *Casting* of their *Spoile*, to live till they be Old: And *Eeles*, which many times breed of *Putrefaction*, will live and grow very long: And those that Enterchange from *Wormes* to *Flies* in the *Summer*, and from *Flies* to *Wormes* in the *Winter*, have been kept in Boxes foure yeares at the least. Yet there are certaine *Flyes*, that are called *Ephemera*, that live but a day. The *Cause* is, the Exilitie of the *Spirit*; Or perhaps the Absence of the *Sunne*; For that if they were brought in, or kept close, they might live longer. Many of the *Insecta*, (as *Butterflies*, and other *Flies*,) revive easily, when they seeme dead, being brought to the *Sunne*, or *Fire*. The *Cause* whereof is, the *Diffusion* of the *Vitall Spirit*, and the easie dilating of it by a little *Heat*. They stirre a good while, after their *Heads* are off, or that they be cut in Peeces; Which is caused also, for that their *Vitall Spirits* are more diffused thorow-out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

698 The *Insecta* have *Voluntarie Motion*, and therefore *Imagination*; And whereas some of the *Ancients* have said, that their *Motion* is Indeterminate, and their *Imagination* Indefinite, it is negligently observed; For *Ants* goe right forwards

forwards to their Hills; And *Bees* doe (admirably) know the way, from a Flowrie Heath, two or thee Miles off, to their Hives. It may be, *Gnats*, and *Flies*, have their *Imagination* more mutable, and giddy, as *Small Birds* likewise have. It is said by some of the *Ancients*, that they have onely the *Sense* of *Feeling*; which is manifestly untrue; For if they goe forth right to a Place, they must needs have Sight: Besides, they delight more in one *Flower*, or *Herb*, than in another, and therefore have *Taste*: And *Bees* are called with *Sound* upon *Brasse*, and therefore they have *Hearing*: Which sheweth likewise that though their *Spirit* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Observations *concerning the* Insecta, *together with the* Enumeration *of them, we referre to that place, where we meane to handle the* Title *of* Animal's *in generall.*

A *Man Leapeth* better with *Weights*, in his *Hands*, than without. The *Cause* is, for that the *Weight*, (if it bee proportionable,) strengtheneth the *Sinewes*, by *Contracting* them. For otherwise, where no *Contraction* is needfull, *Weight* hindreth. As we see in *Horse-Races*, *Men* are curious to fore-see, that there be not the least *Weight*, upon the one *Horse*, more than upon the other. In *Leaping* with *Weights*, the *Armes* are first cast backwards, and then forwards, with so much the greater Force: For the *Hands* goe backward before they take their Raise. *Quære*, if the contrary *Motion* of the *Spirits*, immediately before the *Motion* we intend, doth not cause the *Spirits*, as it were to breake forth with more Force: As *Breath* also drawne, and kept in, commeth forth more forcibly: And in *Casting* of any *Thing*, the *Armes*, to make a greater Swing, are first cast backward.

Experiment Solitary, touching *Leaping*. 696

OF *Musicall Tones*, and *Vnequall Sounds*, wee have spoken before; But touching the *Pleasure*, and *Displeasure* of the *Senses*, not so fully. *Harsh Sounds*, as of a *Saw*, when it is sharpened; *Grinding* of one *Stone* against another; *Squeaking*, or *Skriching Noise*; make a *Shivering* or *Horrour* in the *Bodie*, and set the *Teeth* on edge. The *Cause* is, for that the *Objects* of the *Eare*, do affect the *Spirits* (immediately) most with *Pleasure* and Offence. We see, there is no *Colour* that affecteth the *Eye* much with *Displeasure*: There bee *Sights*, that are *Horrible*, because they excite the *Memory* of *Things* that are *Odious*, or *Fearfull*; But the same *Things Painted* do little affect. As for *Smells*, *Tastes*, and *Touches*, they be *Things* that doe affect, by a *Participation*, or *Impulsion* of the *Body*, of the *Object*. So it is *Sound* alone, that doth immediately, and incorporeally affect most: This is most manifest in *Musicke*; and *Concords* and *Discords* in *Musicke*: For all *Sounds*, whether they be sharp, or Flat, if they be Sweet, have a Roundnesse and *Equality*; And if they be Harsh, are *Vnequall*: For a *Discord* it selfe is but a *Harshnesse* of *Divers Sounds Meeting*. It is true, that *Inequality*, not Stayed upon, but Passing, is rather an Encrease of *Sweetnesse*; As in the *Purling* of a *Wreathed String*; And in the *Raucity* of a *Trumpet*; And in the *Nightinghale-Pipe* of a *Regall*; And in a *Discord* straight falling upon a *Concord*: But if you stay upon it, it is *Offensive*; And therefore, there be these three *Degrees* of *Pleasing*, and *Displeasing* in *Sounds*; *Sweet Sounds*; *Discords*; and *Harsh Sounds*, which we call by divers Names, as *Skriching*, or *Grating*, such as wee now speake of. As for the *Setting* of the *Teeth* on *Edge*, we plainly see what an Intercouse there is, between the *Teeth*, and the *Organ* of the *Hearing*, by the Taking of the End of a Bow, between the *Teeth*, and *Striking* upon the *String*.

Experiment Solitary, touching the *Pleasures*, and *Displeasures* of the *Senses*, especially of *Hearing*. 700

NATVRALL HISTORIE.

VIII. Century.

THere be *Mineralls*, and *Fossiles*, in great Variety; But of *Veines* of *Earth Medicinall*, but few; The Chiefe are, *Terra Lemnia*, *Terra Sigillata communis*, and *Bolus Armi-nus:* Whereof *Terra Lemnia* is the Chiefe. The *Vertues* of them are, for *Curing* of *Wounds*, *Stanching* of *Bloud*, *Stopping* of *Fluxes* and *Rheumes*, and *Arresting* the *Spreading* of *Poison*, *Infection*, and *Putrefaction:* And they have of all other *Simples*, the Perfectest and Purest *Qualitie* of *Drying*, with little or no Mixture of any other *Quality*. Yet it is true, that the *Bole-Arminick* is the most *Cold* of them; And that *Terra Lemnia* is the most *Hot*; For which Cause, the *Island Lemnos*, where it is digged, was in the Old *Fabulous Ages* consecrated to *Vulcan*.

Experiment Solitary, touching *Veines* of *Medicinall Earth*. 701

ABout the *Bottome* of the *Straights* are gathered great Quantities of *Sponges*, which are gathered from the sides of *Rockes*, being as it were a large, but tough, *Mosse*. It is the more to be noted, because that there bee but few *Substances*, *Plant-like*, that grow deep within the *Sea*; For they are gathered sometimes fifteen Fathome deepe; And when they are laid on Shoare, they seeme to be of great Bulke; But crushed together, will be transported in a very small Roome.

Experiment Solitary, touching the *Growth* of *Sponges*. 702

IT seemeth, that *Fish*, that are used to the *Salt-Water*, doe nevertheless delight more in *Fresh*. We see, that *Salmons*, and *Smelts* love to get into *Rivers*, though it be against the *Stream*. At the *Haven* of *Constantinople*, you shall have great *Quantities* of *Fish* that come from the *Euxine-Sea*; that when they come into the *Fresh Water*, doe inebriate and turne up their *Bellies*; So as you may take them with your Hand. I doubt, there hath not beene sufficient *Ex-*

Experiment Solitary, touching *Sea-Fish* put in *Fresh waters*. 703

periment made of Putting *Sea-Fish* into *Fresh Water*, *Ponds*, and *Pooles*. It is a Thing of great Use, and Pleasure: For so you may have them new at some good distance from the *Sea*: And besides, it may bee, the *Fish* will eat the pleasanter, and may fall to breed: And it is said that *Colchester Oysters*, which are put into Pits, where the *Sea* goeth and commeth, (but yet so, that there is a *Fresh Water* comming also to them, when the *Sea* voideth,) become by that meanes Fatter, and more Growne.

Experiment Solitary, touching *Attraction* by *Similitude* of *Substance*. 704

THe *Turkish-Bow* giveth a very Forcible *Shoot*; Insomuch as it hath beene knowne, that the *Arrow* hath pierced a *Steele Target*, or a Peece of *Brasse* of two Inches thicke: But that which is more strange, the *Arrow*, if it be Headed with *Wood*, hath beene knowne to pierce thorow a Peece of *Wood*, of eight Inches thicke. And it is certaine, that we had in use at one time, for *Sea-Fight*, short *Arrowes*, which they called *Sprights*, without any other Heads, save *Wood* sharpened; which were discharged out of *Muskets*, and would pierce thorow the Sides of *Ships*, where a *Bullet* would not pierce. But this dependeth upon one of the greatest *Secrets* in all *Nature*; Which is, that *Similitude* of *Substance* will cause *Attraction*, where the Body is wholly freed from the *Motion* of *Gravity*: For if that were taken away, *Lead* would draw *Lead*, and *Gold* would draw *Gold*, and *Iron* would draw *Iron*, without the help of the *Load-Stone*. But this same *Motion* of *Weight* or *Gravitie*, (which is a meere *Motion* of the *Matter*, and hath no Affinity with the *Forme*, or *Kinde*,) doth kill the other *Motion*, except it selfe bee killed by a violent *Motion*; And in these *Instances* of *Arrowes*; For then the *Motion* of *Attraction* by *Similitude* of *Substance*, beginneth to shew it selfe. But we shall handle this Point of *Nature* fully in due Place.

Experiment Solitary, touching certaine *Drinkes* in *Turkey*. 705

THey have in *Turkey*, and the *East*, certaine *Confections*, which they call *Serbets*, which are like to *Candied Conserves*; And are made of *Sugar* and *Limons*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and some other Flowers; And some Mixture of *Amber* for the more delicate Persons; And those they dissolve in *Water*, and thereof make their *Drinke*, because they are forbidden *Wine* by their *Law*. But I doe much marvell, that no *Englishman*, or *Dutchman*, or *German*, doth set up *Brewing* in *Constantinople*; Considering they have such Quantity of *Barley*. For as for the generall Sort of *Men*, Frugality may be the *Cause* of *Drinking Water*; For that it is no small Saving, to pay nothing for ones *Drinke*: But the better Sort mought well be at the Cost. And yet I wonder the lesse at it, because I see *France*, *Italy*, or *Spaine*, have not taken into use, *Beere*, or *Ale*; Which (perhaps) if they did, would better both their Healths, and their Complexions. It is likely it would be Matter of great Gaine to any, that should begin it in *Turkey*.

Experiments in Consort touching *Sweat*. 706

IN *Bathing* in *Hot Water*, *Sweat* (nevertheless) commeth not in the *Parts* under the *Water*. The *Cause* is; First, for that *Sweat* is a Kinde of *Colliquation*. And that Kinde of *Colliquation* is not made, either by an *Over-Drie Heat*, or an *Over-Moist Heat*. For *Over-Moisture* doth somewhat extinguish the *Heat*; As wee see that even *Hot-Water* quencheth *Fire*: And *Over-Drie Heat* shutteth the *Pores*: And therefore *Men* will sooner *Sweat* covered before the *Sunne*, or *Fire*, than if they stood naked; And *Earthen Bottles*, filled with *Hot Water*, doe provoke, in Bed, a *Sweat* more daintily, than *Brick-Bats Hot*. Secondly, *Hot Water* doth cause *Evaporation* from the *Skin*; So as it spendeth the Matter, in those Parts under the *Water*, before it issueth in

Sweat.

Sweat. Againe, *Sweat* commeth more plentifully, if the *Heat* bee increased by *Degrees*, than if it be greatest at first, or equall. The *Cause* is, for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening the *Sweat* issueth more abundantly. And therefore *Physitians* may doe well, when they provoke *Sweat* in Bed, by *Bottles*, with a *Decoction* of *Sudorifick Herbs* in *Hot Water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the Bed, the *lesse Heated* first, and after halfe an Houre the *more Heated*.

Sweat is *Salt* in Taste; The *Cause* is, for that, that *Part* of the *Nourishment*, which is *Fresh* and *Sweet*, turneth into *Bloud*, and *Flesh*; And the *Sweat* is onely that *Part*, which is *Separate*, and *Excerned*. *Bloud* also Raw, hath some *Saltnesse*, more than Flesh; because the *Assimilation* into *Flesh*, is not without a little and subtile *Excretion* from the *Bloud*. 707

Sweat commeth forth more out of the *Vpper Parts* of the *Body*, than the *Lower*; The *Reason* is, because those *Parts* are more repleni shed with *Spirits*; And the *Spirits* are they that put forth *Sweat*: Besides, they are lesse *Fleshy*, and *Sweat* issueth (chiefly) out of the *Parts* that are lesse *Fleshy*, and more *Drie*; As the *Forehead*, and *Breast*. 708

Men *Sweat* more in *Sleepe*, than *Waking*; And yet *Sleep* doth rather stay other *Fluxions*, than cause them; As *Rheumes*, *Loosenesse* of the *Body*, &c. The *Cause* is, for that in *Sleepe*, the *Heat*, and *Spirits* doe naturally move inwards, and there rest. But when they are collected once within, the *Heat* becommeth more Violent, and Irritate; And thereby expelleth *Sweat*. 709

Cold Sweats are (many times) *Mortall*, and neare *Death*; And alwayes *Ill*, and *Suspected*; As in *Great Feares*, *Hypochondriacall Passions*, &c. The *Cause* is, for that *Cold Sweats* come by a *Relaxation* or *Forsaking* of the *Spirits*, whereby the *Moisture* of the Body, which *Heat* did keepe firme in the *Parts*, severeth, and issueth out. 710

In those *Diseases* which cannot be discharged by *Sweat*, *Sweat* is ill, and rather to bee stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it easeth and lightneth; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the Latter Sort is partly *Critical*, and sendeth forth the *Matter* that offendeth; But in the Former, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them Oppressed; Or from *Motion* of *Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moveth to an *Expulsion* indifferent over all the *Body*. 711

Experiment Solitary, touching the *Glo-worme*.

THe *Nature* of the *Glo-worme* is hitherto not well observed. Thus much we see; That they breed chiefly in the *Hottest Moneths* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes*, and *Hedges*. Whereby it may be conceived, that the *Spirit* of them is very fine, and not to be refined, but by *Summer Heats*: And againe, that by reason of the Fineness, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Flie* they call *Lucciole*, that shineth as the *Glo-worme*, doth; And it may be is the *Flying Glo-worme*. But that *Flie* is chiefly upon *Fens*, and *Marrishes*. But yet the two former *Observations* hold; For they are not seene, but in the *Heat* of *Summer*; And *Sedge*, or other *Greene* of the *Fens*, give as good Shade, as *Bushes*. It may be the *Glo-wormes* of the *Cold Countries* ripen not so farre as to be *Winged*. 712

Experiments in Consort, touching the *Impressions*, which the *Passions* of the *Minde* make upon the *Body*.

THe *Passions* of the *Minde*, worke upon the *Body* the *Impressions* following. *Feare* causeth *Paleness*; *Trembling*; The *Standing* of the *Haire upright*; 713

right; *Starting*; and *Scritching*. The *Paleneſſe* is cauſed, for that the *Bloud* runneth inward, to ſuccour the *Heart*. The *Trembling* is cauſed, for that through the *Flight* of the *Spirits* inward, the *Outward Parts* are deſtituted, and not ſuſtained. *Standing upright* of the *Haire* is cauſed, for that by *Shutting* of the *Pores* of the *Skin*, the *Haire* that lyeth aſloape, muſt needs Riſe. *Starting* is both an *Apprehenſion* of the *Thing feared*; (And, in that Kinde, it is a *Motion* of *Shrinking*;) And likewiſe an *Inquiſition*, in the beginning, what the Matter ſhould be; (And in that kinde it is a *Motion* of *Erection*;) And therefore, when a *Man* would liſten ſuddenly to any Thing, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend. *Skritching* is an *Appetite* of *Expelling* that which ſuddenly ſtriketh the *Spirits*: For it muſt bee noted, that many *Motions*, though they bee unprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cauſe *Motions* by *Conſent*; As in *Groaning*, or *Crying* upon *Paine*.

714 *Griefe*, and *Paine* cauſe *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Roaring*; *Teares*; *Diſtorting* of the *Face*; *Grinding* of the *Teeth*; *Sweating*. *Sighing* is cauſed by the *Drawing* in of a greater *Quantity* of *Breath* to refreſh the *Heart* that laboureth: like a great *Draught* when one is thirſty. *Sobbing* is the ſame Thing ſtronger. *Groaning*, and *Screaming*, and *Roaring*, are cauſed by an *Appetite* of *Expulſion*, as hath beene ſaid: For when the *Spirits* cannot expell the Thing that hurteth, in their Striſe to doe it, by *Motion* of *Conſent*, they expell the *Voice*. And this is, when the *Spirits* yeeld, and give over to reſiſt; For if one doe conſtantly reſiſt *Paine*, he will not groane. *Teares* are cauſed by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by conſequence aſtringeth the *Moiſture* of the *Braine*, and thereby ſendeth *Teares* into the *Eyes*. And this *Contraction*, or *Compreſſion* cauſeth alſo *Wringing* of the *Hands*; For *Wringing* is a *Geſture* of *Expreſſion* of *Moiſture*. The *Diſtorting* of the *Face* is cauſed by a *Contention*, firſt to beare and reſiſt, and then to expell; Which maketh the Parts knit firſt, and afterwards open. *Grinding* of the *Teeth* is cauſed (likewiſe) by a *Gathering* and *Serring* of the *Spirits* together to reſiſt; Which maketh the *Teeth* alſo to ſet hard one againſt another. *Sweating* is alſo a *Compound Motion* by the *Labour* of the *Spirits*, firſt to reſiſt, and then to expell.

715 *Ioy* cauſeth a *Chearefulneſſe* and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And ſometimes *Teares*. All theſe are the effects of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Lively*, and *Stirring*. We know it hath beene ſeene, that *Exceſſive ſudden Ioy* hath cauſed *Preſent Death*, while the *Spirits* did ſpread ſo much, as they could not retire againe. As for *Teares*, they are the Effects of *Compreſſion* of the *Moiſture* of the *Braine*, upon *Dilatation* of the *Spirits*. For *Compreſſion* of the *Spirits* worketh an *Expreſſion* of the *Moiſture* of the *Braine*, by *Conſent*, as hath beene ſaid in *Griefe*. But then in *Ioy*, it worketh it diverſly; *viz.* by *Propulſion* of the *Moiſture*, when the *Spirits* dilate, and occupie more Roome.

716 *Anger* cauſeth *Paleneſſe* in ſome, and the *Going* and *Comming of the Colour* in Others: Alſo *Trembling* in ſome; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fiſt*. *Paleneſſe*, and *Going*, and *Comming* of the *Colour*, are cauſed by the *Burning* of the *Spirits* about the *Heart*; Which to refreſh themſelves, call in more *Spirits* from the *Outward Parts*. And if the *Paleneſſe* be alone, without *Sending forth* the *Colour* againe, it is commonly joyned with ſome *Feare*; But in many there is no *Paleneſſe* at all, but contrariwiſe *Redneſſe* about the *Cheekes*, and *Gills*; Which is by the *Sending forth* of the

Spirits

Spirits in an *Appetite* to *Revenge*. *Trembling* in *Anger*, is likewiſe by a *Calling* in of the *Spirits*; And is commonly, when *Anger* is joyned with *Feare*. *Swelling* is cauſed, both by a *Dilatation* of the *Spirits* by *Over-Heating*, and by a *Liquefaction* or *Boyling* of the *Humours* thereupon. *Foaming* at the *Mouth* is from the ſame *Cauſe*, being an *Ebullition*, *Stamping*, and *Bending* of the *Fiſt*, are cauſed by an *Imagination* of the *Act* of *Revenge*.

Light Diſpleaſure or *Diſlike*, cauſeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Browes*. Theſe *Effects* ariſe from the ſame *Cauſes* that *Trembling*, and *Horrour* doe; Namely, from the *Retiring* of the *Spirits*, but in a leſſe degree. For the *Shaking* of the *Head* is but a Slow and Definite *Trembling*; And is a *Geſture* of *Slight Refuſall*: And we ſee alſo, that a *Diſlike* cauſeth (often) that *Geſture* of the *Hand*, which we uſe, when we refuſe a Thing, or warne it away. The *Frowning* and *Knitting* of the *Browes*, is a *Gathering*, or *Serring* of the *Spirits*, to reſiſt in ſome Meaſure. And we ſee alſo, this *Knitting* of the *Browes* will follow upon earneſt *Studying*, or *Cogitation* of any Thing, though it be without *Diſlike*. 717

Shame cauſeth *Bluſhing*; And *Caſting Downe* of the *Eyes*. *Bluſhing* is the *Reſort* of *Bloud* to the *Face*; Which in the *Paſſion* of *Shame*, is the *Part* that laboureth moſt. And although the *Bluſhing* will be ſeen in the whole *Breaſt*, if it bee Naked, yet that is but in Paſſage to the *Face*. As for the *Caſting downe* of the *Eyes*, it proceedeth of the *Reverence* a Man beareth to other Men; Whereby, when he is aſhamed, he cannot endure to looke firmely upon Others: And we ſee, that *Bluſhing*, and the *Caſting downe* of the *Eyes* both, are more when wee come before Many; *Ore Pompeii quid Mollius? Nunquàm non coram pluribus erubuit*: And likewiſe when we come before *Great*, or *Reverend Perſons*. 718

Pitie cauſeth ſometimes *Teares*; And a *Flexion* or *Caſt* of the *Eye aſide*. *Teares* come from the ſame *Cauſe* that they doe in *Griefe*: for *Pitie* is but *Griefe* in Anothers Behalfe. The *Caſt* of the *Eye* is a *Geſture* of *Averſion*, or *Lothneſſe* to behold the *Object* of *Pitie*. 719

Wonder cauſeth *Aſtoniſhment*, or an *Immoveable Poſture* of the *Body*; *Caſting* up of the *Eyes* to *Heaven*; And *Lifting* up of the *Hands*. For *Aſtoniſhment*, it is cauſed by the *Fixing* of the *Minde* upon one *Object* of *Cogitation*, whereby it doth not ſpatiate and tranſcurre, as it uſeth: For in *Wonder* the *Spirits* flie not, as in *Feare*; But onely ſettle, and are made leſſe apt to move. As for the *Caſting* up of the *Eyes*, and *Lifting* up of the *Hands*, it is a *Kinde* of *Appeale* to the *Deity*; Which is the *Authour*, by *Power*, and *Providence*, of *Strange Wonders*. 720

Laughing cauſeth a *Dilatation* of the *Mouth*, and *Lips*; A *Continued Expulſion* of the *Breath*, with the loud *Noiſe*, which maketh the *Interjection* of *Laughing*; *Shaking* of the *Breaſt*, and *Sides*; *Running* of the *Eyes* with *Water*, if it be Violent, and Continued. Wherein firſt it is to be underſtood, that *Laughing* is ſcarce (properly) a *Paſſion*, but hath his *Source* from the *Intellect*; For in *Laughing* there ever precedeth a *Conceit* of ſomewhat *Ridiculous*. And therefore it is Proper to *Man*. Secondly, that the *Cauſe* of *Laughing* is but a *Light Touch* of the *Spirits*, and not ſo deepe an *Impreſſion* as in other *Paſſions*. And therefore, (that which hath no *Affinitie* with the *Paſſions* of the *Minde*,) it is moved, and that in great vehemency, onely by *Tickling* ſome *Parts* of the *Body*: And we ſee that *Men* even in a *Grieved State* of *Minde*, yet cannot ſometimes forbeare *Laughing*. Thirdly, it is ever joyned with ſome *Degree* of *Delight*: And therefore *Exhilaration* hath ſome *Affinitie* with *Ioy*, though it be a much *Lighter Motion*: *Res ſevera eſt verum Gaudium*. 721

dium. Fourthly, that the *Object* of it is *Deformitie*, *Absurditie*, *Shrewd Turnes*, and the like. Now to speake of the *Causes* of the *Effects* before mentioned, whereunto these *Generall Notes* give some *Light*. For the *Dilatation* of the *Mouth* and *Lips*, *Continued Expulsion* of the *Breath* and *Voice*, and *Shaking* of the *Breast* and *Sides*, they proceed (all) from the *Dilatation* of the *Spirits*; Especially being Sudden. So likewise, the *Running* of the *Eyes* with *Water*, (as hath beene formerly touched, where wee spake of the *Teares* of *Ioy* and *Griefe*,) is an Effect of *Dilatation* of the *Spirits*. And for *Suddennesse*, it is a great *Part* of the *Matter*: For we see, that any *Shrewd Turne* that lighteth upon Another; Or any *Deformity*, &c. moveth *Laughter* in the Instant; Which after a little time it doth not. So we cannot *Laugh* at any thing after it is *Stale*, but whilest it is *New*: And even in *Tickling*, if you *Tickle* the *Sides*, and give warning; Or give a *Hard* or *Continued Touch*, it doth not move *Laughter* so much.

712 *Lust* causeth a *Flagrancy* in the *Eyes*; and *Priapisme*. The *Cause* of both these is, for that in *Lust*, the *Sight*, and the *Touch*, are the Things desired: And therefore the *Spirits* resort to those parts, which are most affected. And note well in generall, (for that great Use may be made of the *Observation*,) that (evermore) the *Spirits*, in all *Passions*, resort most to the *Parts*, that labour most, or are most affected. As in the last, which hath been mentioned, they resort to the *Eyes*, and *Venereous Parts*: In *Feare*, and *Anger*, to the *Heart*: In *Shame* to the *Face*: And in *Light Dislikes* to the *Head*.

Experiments in Consort, touching *Drunkennesse*.

IT hath been observed by the *Ancients*, and is yet beleeved, that the *Sperme* of *Drunken Men* is *Unfruitfull*. The *Cause* is, for that it is *Over-moistened*, and wanteth *Spissitude*. And wee have a merry Saying, that they that goe *Drunke* to *Bed*, get *Daughters*.

723

724 *Drunken Men* are taken with a plaine *Defect*, or *Destitution* in *Voluntary Motion*. They Reele; They tremble; They cannot stand, nor speak strongly. The *Cause* is, for that the *Spirits* of the *Wine*, oppresse the *Spirits Animall*, and occupate Part of the Place, where they are; And so make them Weake to move. And therefore, *Drunken Men* are apt to fall asleep: And *Opiates*, and *Stupefactives*, (as *Poppy*, *Henbane*, *Hemlocke*, &c.) induce a kinde of *Drunkennesse*, by the *Grossenesse* of their *Vapour*: As *Wine* doth by the *Quantity* of the *Vapour*. Besides, they rob the *Spirits Animall* of their *Matter*, whereby they are nourished: For the *Spirits* of the *Wine* prey upon it, as well as they: And so they make the *Spirits* lesse Supple, and Apt to move.

725 *Drunken Men* imagine every *Thing turneth round*; They imagine also that *Things come upon them*; They *See* not well *Things a farre off*; Those Things that they *See neare Hand*, they *See out of their Place*; And (sometimes) they *see Things double*. The *Cause* of the Imagination that *Things turne Round*, is, for that the *Spirits* themselves turne, being compressed by the *Vapour* of the *Wine*: (For any *Liquid Body* upon *Compression*, turneth, as we see in *Water*:) And it is all one to the *Sight*, whether the *Visuall Spirits* move, or the *Object* moveth, or the *Medium* moveth. And we see that long *Turning Round* breedeth the same Imagination. The *Cause* of the Imagination that *Things come upon them*, is, for that the *Spirits Visuall* themselves draw backe; which maketh the *Object* seeme to come on. And besides, when they see Things turne Round, and Move, *Feare* maketh them thinke they come upon them. The *Cause* that they cannot see *Things a farre off*, is the *Weakenesse* of the *Spirits*; for in every *Megrim*, or *Vertigo*, there is an *Obtenebration* joyned with a Semblance of *Turning Round*; Which we see also in the lighter Sort of *Swou-*

nings.

nings. The *Cause* of *Seeing things out of their Place*, is the *Refraction* of the *Spirits Visuall*; For the *Vapour* is as an *Vnequall Medium*; And it is, as the Sight of Things, out of place, in *Water*. The *Cause* of *Seeing Things double*, is, the *Swift* and *Vnquiet Motion* of the *Spirits*, (being Oppressed,) to and fro; For, (as was said before,) the *Motion* of the *Spirits Visuall*, and the *Motion* of the *Object*, make the same *Appearances*; And for the *Swift Motion* of the *Object*, wee see, that if you fillip a *Lute-String*, it sheweth double, or Treble.

Men are sooner *Drunke* with *Small Draughts*, than with *Great*. And againe, *Wine Sugred* inebriateth lesse, than *Wine Pure*. The *Cause* of the Former is, for that the *Wine* descendeth not so fast to the *Bottome* or the *Stomach*; But maketh longer Stay in the *Vpper Part* of the *Stomach*, and sendeth *Vapours* faster to the *Head*; And therefore inebriateth sooner. And, for the same Reason, *Sops* in *Wine*, (Quantity for Quantity,) inebriate more, than *Wine* of it selfe. The *Cause* of the Latter is, for that the *Sugar* doth inspissate the *Spirits* of the *Wine*, and maketh them not so easie to resolve into *Vapour*. Nay further, it is thought, to be some Remedy against *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the same Effect is wrought either by *Oyle*, or *Milke*, taken upon much *Drinking*. 726

THe *Vse* of *Wine*, in *Drie*, and *Consumed Bodies*, is hurtfull; In *Moist*, and *Full Bodies*, it is good. The *Cause* is, for that the *Spirits* of the *Wine* doe prey upon the *Dew*, or *Radicall Moisture*, (as they terme it,) of the *Body*, and so deceive the *Animall Spirits*. But where there is *Moisture* Enough, or Superfluous, there *Wine* helpeth to disgest, and desiccate the *Moisture*. Experiment Solitary, touching the *Help* or *Hurt* of *Wine*, though *Moderately vsed*. 727

THe *Catterpiller* is one of the most Generall of *Wormes*, and breedeth of *Dew*, & *Leaves*: For we see infinite Number of *Catterpillers*, which breed upon *Trees*, and *Hedges*, By which the *Leaves* of the *Trees*, or *Hedges*, are in great Part consumed; As well by their Breeding out of the *Leafe*, as by their Feeding upon the *Leafe*. They breed in the *Spring* chiefly, because then there is both *Dew*, and *Leafe*. And they breed commonly when the *East Winds* have much blowne: The *Cause* whereof is, the *Drinesse* of that *Wind*: For to all *Vivification* upon *Putrefaction*, it is requisite the *Matter* be not too *Moist*: And therefore we see, they have *Copwebs* about them, which is a signe of a *Slimy Drinesse*: As wee see upon the *Ground*, whereupon, by *Dew*, and *Sunne*, *Copwebs* breed all over. We see also the *Greene Catterpiller* breedeth in the Inward Parts of *Roses*, especially not blowne, where the *Dew* sticketh: But especially *Catterpillers*, both the greatest, and the most, breed upon *Cabbages*, which have a *Fat Leafe*, and apt to *Putrifie*. The *Catterpiller* towards the *End* of *Summer* waxeth *Volatile*, and turneth to a *Butterflie*, or perhaps, some other *Fly*. There is a *Catterpiller*, that hath a *Furre*, or *Downe* upon him, and seemeth to have Affinitie with the *Silke-worme*. Experiment Solitary, touching *Catterpillers*. 728

THe *Flies Cantharides* are bred of a *Worme*, or *Catterpiller*, but peculiar to certaine *Fruit-Trees*; As are the *Fig-tree*, the *Pine-tree*, and the *Wilde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of secret *Biting*, or *Sharpnesse*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corrosive*: The *Pine-Apple* hath a *Kernell* that is *Strong* and *Abstersive*: The *Fruit* of the *Briar* is said to make *Children*, or those that Eat them, *Scabbed*. And therefore, no marvell though *Cantharides* have such a *Corrosive*, and *Cauterizing Quality*; For there is not one other of the *Insecta*, but is bred of a *Duller Matter*. The *Body* of the *Cantharides* is bright coloured; And it may be; Experiment Solitary, touching the *Flies Cantharides*. 729

be, that the delicate-coloured *Dragon-Flies*, may have likewise some *Corrosive Qualitie*.

Experiments in Consort, touching *Lassitude*.

730 *Lassitude* is remedied by *Bathing*, or *Annointing* with *Oyle*, and *Warme Water*. The *Cause* is, for that all *Lassitude* is a kinde of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Annointing* give a *Relaxation*, or *Emollition*: And the *Mixture* of *Oyle*, and *Water*, is better than either of them alone; Because *Water* Entreth better into the *Pores*, and *Oyle* after Entry softneth better. It is found also, that the *Taking* of *Tobacco* doth helpe and discharge *Lassitude*. The Reason whereof is, partly, because by Chearing or Comforting of the *Spirits*, it openeth the *Parts Compressed*, or *Contused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so dischargeth *Wearinesse*; as *Sleepe* likewise doth.

731 In *Going up a Hill*, the *Knees* will be most *Weary*; In *Going downe a Hill*, the *Thighes*. The *Cause* is, for that in the *Lift* of the *Feet*, when a Man *Goeth up the Hill*, the Weight of the *Body* beareth most upon the *Knees*; And in *Going downe the Hill*, upon the *Thighes*.

Experiment Solitary, touching the *Casting* of the *Skin*, and *Shell* in some *Creatures*.

732 THe *Casting* of the *Skin*, is by the *Ancients* compared, to the *Breaking* of the *Secundine*, or *Call*; but not rightly: For that were to make every *Casting* of the *Skin* a New *Birth*: And besides, the *Secundine* is but a generall *Cover*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are; The *Snake*, the *Viper*, the *Grashopper*, the *Lizard*, the *Silke-worme*, &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crafish*, the *Hodmandod* or *Dodman*, the *Tortoise*, &c. The *Old Skins* are found, but the *Old Shells* never: So as it is like, they scale off, and crumble away by degrees. And they are knowne, by the Extreame *Tendernesse* and *Softinesse* of the *New Shell*; And somewhat by the *Freshnesse* of the *Colour* of it. The *Cause* of the *Casting* of *Skin*, and *Shell*, should seeme to be the great *Quantitie* of *Matter* in those *Creatures*, that is fit to make *Skin* or *Shell*; And againe, the *Loosnesse* of the *Skin*, or *Shell*, that sticketh not close to the *Flesh*. For it is certaine, that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we see, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds* that have much *Matter* for their *Beake*, cast their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments in Consort, touching the *Postures* of the *Body*.

733 *Lying*, not *Erect*, but *Hollow*, which is in the Making of the Bed; Or with the *Legs gathered up*, which is in the Posture of the Body, is the more Wholesome. The *Reason* is, the better *Comforting* of the *Stomach*, which is by that lesse Pensile: And we see, that in Weake *Stomachs*, the Laying up of the Legs high, and the Knees almost to the Mouth, helpeth, and comforteth. We see also that *Gally-Slaves*, notwithstanding their Miserie otherwise, are commonly Fat and Fleshy; And the Reason is, because the *Stomach* is supported somewhat in *Sitting*; And is Pensile in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to choose those *Exercises*, where the *Limbs* move more than the *Stomach*, and Belly; As in *Rowing*, and in *Sawing*, being *Set*.

734 *Megrims* and *Giddinesse* are rather when we *Rise*, after long *Sitting*, than while we *Sit*. The *Cause* is, for that the *Vapours*, which were gathered by *Sitting*, by the Sudden *Motion*, flie more up into the *Head*.

735 *Leaning long* upon any *Part* maketh it *Numme*, and, as we call it, Asleepe.

The

The *Cause* is, for that the *Compression* of the *Part* suffereth not the *Spirits* to have free Accesse; And therefore when we come out of it, wee feele a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

Experiment Solitary, touching *Pestilentiall Yeares*. 736

IT hath beene noted, that those *Yeares* are *Pestilentiall*, and *Unwholesome*, when there are great Numbers of *Frogs*, *Flies*, *Locusts*, &c. The *Cause* is plaine; For that those *Creatures* being engendred of *Putrefaction*, when they abound, shew a generall *Disposition* of the *Yeare*, and *Constitution* of the *Aire*, to *Diseases* of *Putrefaction*. And the same *Prognosticke*, (as hath beene said before,) holdeth, if you find *Wormes* in *Oake-Apples*. For the *Constitution* of the *Aire*, appeareth more subtilly, in any of these *Things*, than to the *Sense* of *Man*.

Experiment Solitary, touching the *Prognosticks* of *Hard Winters*. 737

IT is an Observation amongst *Country-People*, that *Yeares* of *Store* of *Hawes* and *Heps*, doe commonly portend *Cold Winters*; And they ascribe it to *Gods Providence*, that, (as the *Scripture* saith) reacheth even to the *Falling of a Sparrow*; And much more is like to reach to the *Preservation* of *Birds* in such *Seasons*. The *Naturall Cause* also may be the *Want* of *Heat*, and *Abundance* of *Moisture*, in the *Summer* precedent; Which putteth forth those *Fruits*, and must needs leave great *Quantity* of *Cold Vapours*, not dissipate; Which causeth the *Cold* of the *Winter* following.

Experiment Solitary, touching *Medicines* that *Condense*, and *Relieve* the *Spirits*. 738

THey have in *Turkey*, a *Drinke* called *Coffa*, made of a *Berry* of the same Name, as Blacke as *Soot*, and of a *Strong Sent*, but not *Aromaticall*; Which they take, beaten into Powder, in *Water*, as Hot as they can drinke it: And they take it, and sit at it in their *Coffa-Houses*, which are like our *Tavernes*. This *Drinke* comforteth the *Braine*, and *Heart*, and helpeth *Disgestion*. Certainly this *Berry-Coffa*; The *Root*, and *Leafe Betell*; The *Leafe Tobacco*; And the *Teare* of *Poppy*, (*Opium*,) of which the *Turkes* are great Takers, (supposing it expelleth all Feare;) doe all Condense the *Spirits*, and make them Strong, and Aleger. But it seemeth they are taken after severall manners; For *Coffa* and *Opium* are taken downe; *Tobacco* but in *Smoake*; And *Betell* is but champed in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quære* of *Henbane-Seed*; Of *Mandrake*; Of *Saffron*, Root, and Flower; Of *Folium Indum*; Of *Amber-grice*; of the *Assyrian Amomum*, if it may bee had; And of the *Scarlet Powder*, which they call *Kermez*; And (generally) of all such Things, as doe inebriate and provoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible ever than *Leaves*.

Experiment Solitary, touching *Paintings* of the *Body*. 739

THe *Turkes* have a *Blacke Powder*, made of a *Minerall* called *Alcohole*; Which with a fine long Pencill they lay under their *Eye-Lids*; Which doth colour them Blacke; Whereby the *White* of the *Eye* is set off more *white*. With the same *Powder* they colour also the *Haires* of their *Eye lids*, and of their *Eye-browes*, which they draw into Embowed *Arches*. You shall finde that *Xenophon* maketh Mention, that the *Medes* used to paint their *Eyes*. The *Turkes* use with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beards* Blacke: And divers with us, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* black, by Combing it, (as they say,) with a Leaden Combe, or the like. As for the *Chineses*, who are of an ill Complexion, (being Olivaster,) they paint their *Cheekes* Scarlet; Especially their *King*, and *Grandes*. Generally, *Barbarous People*, that goe Naked,

Naked, doe not onely paint Themselves, but they pownce and raze their Skinne, that the *Painting* may not be taken forth; And make it into Works. So doe the *West Indians*; And so did the Ancient *Picts*, and *Brittons*; So that it seemeth, *Men* would have the *Colours* of *Birds Feathers*, if they could tell how; Or at least, they will have *Gay Skins*, in stead of *Gay Cloathes*.

Experiment Solitary, touching the *Vse* of *Bathing* and *Annointing*. 740

IT is strange, that the *use* of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and the *Grecians*, it was as usuall, as *Eating*, or *Sleeping*: And so is it amongst the *Turkes* at this day: Whereas with us it remaineth but as a *Part* of *Physicke*. I am of Opinion, that the Use of it, as it was with the *Romans*, was hurtfull to Health; For that it made the Body Soft, and easie to Waste. For the *Turkes* it is more proper, because of their *Drinking Water*, and *Feeding* upon *Rize*, and other Food of small Nourishment, maketh their *Bodies* so Solide, and Hard, as you need not feare that *Bathing* should make them *Froathy*. Besides, the *Turkes* are great *Sitters*, and seldome walke; Whereby they Sweat lesse, and need *Bathing* more. But yet certain it is, that *Bathing*, and especially *Annointing*, may be so used, as it may be a great Help to *Health*, and *Prolongation* of *Life*. But hereof we shall speake in due Place, when we come to handle *Experiments Medicinall*.

Experiment Solitary touching *Chamoletting* of *Paper*. 741

THe *Turks* have a Pretty Art of *Chamoletting* of *Paper*, which is not with us in use. They take divers *Oyled Colours*, and put them severally (in drops) upon *Water*; And stirre the *Water* lightly; And then wet their *Paper*, (being of some Thicknesse,) with it; And the *Paper* will bee Waved, and Veined, like *Chamolet*, or *Marble*.

Experiment Solitary, touching *Cuttle-Inke*. 742

IT is somewhat strange, that the *Bloud* of all *Birds*, and *Beasts*, and *Fishes*, should be of a *Red Colour*, and onely the *Bloud* of the *Cuttle* should bee as *Blacke* as *Inke*. A Man would thinke, that the *Cause* should be the *High Concoction* of that *Bloud*; For we see in ordinary *Puddings*, that the *Boyling* turneth the *Bloud* to be *Blacke*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Request.

Experiment Solitary, touching *Encrease* of *Weight* in *Earth*. 743

IT is reported of Credit, that if you take *Earth*, from Land adjoyning to the *River* of *Nile*; And preserve it in that manner, that it neither come to be Wet, nor Wasted; And Weigh it daily, it will not alter *Weight* untill the seventeenth of *Iune*, which is the Day when the *River* beginneth to rise; And then it will grow more and more *Ponderous* till the *River* commeth to his Heighth. Which if it be true, it cannot bee caused, but by the *Aire*, which then beginneth to Condense; And so turneth within that Small *Mould* into a degree of *Moisture*; Which produceth *Weight*. So it hath beene observed, that *Tobacco*, Cut, and Weighed, and then Dried by the Fire, loseth Weight; and after being laid in the open *Aire*, recovereth *Weight* againe. And it should seeme, that as soone as ever the *River* beginneth to increase, the whole *Bodie* of the *Aire* thereabouts suffereth a Change: For (that which is more strange,) it is credibly affirmed, that upon that very Day, when the *River* first riseth, great *Plagues*, in *Cairo*, use suddenly to breake up.

Experiments in Consort, touching *Sleep*. 744

THose that are very *Cold*, and especially in their *Feet*, cannot get to *Sleepe*. the *Cause* may be, for that in *Sleepe* is required a *Free Respiration*, which *Cold* doth shut in, and hinder: For we see, that in great *Colds*, one can scarce draw

draw his *Breath*. Another *Cause* may be, for that *Cold* calleth the *Spirits* to succour; And therefore they cannot so well close, and goe together in the *Head*; which is ever requisite to *Sleepe*. And for the same *Cause*, *Paine*, and *Noise* hinder *Sleepe*; And *Darkenesse* (contrariwise) furthereth *Sleepe*.

Some *Noises* (whereof wee spake in the 112. *Experiment*) help *Sleep*; As the *Blowing* of the *Wind*, the *Trickling* of *Water*, *Humming* of *Bees*, *Soft Singing*, *Reading*, &c. The *Cause* is, for that they move in the *Spirits* a gentle *Attention*; And whatsoever moveth *Attention*, without too much Labour, stilleth the Naturall and discursive *Motion* of the *Spirits*. 745

Sleepe nourisheth, or at least preserveth *Bodies*, a long time, without other *Nourishment*. *Beasts* that sleep in *Winter*, (as it is noted of *Wilde Beares*,) during their *Sleepe* wax very Fat, though they Eat nothing. *Bats* have bin found in Ovens, and other Hollow Close Places, Matted one upon another; And therefore it is likely that they *Sleepe* in the *Winter time*, and eat Nothing. *Quære*, whether *Bees* doe not *Sleep* all Winter, and spare their *Honey*? *Butterflies*, and other *Flies*, doe not onely *Sleep*, but lie as *Dead* all *Winter*; And yet with a little *Heat* of *Sunne*, or *Fire*, revive againe. A *Dormouse*, both *Winter* and *Summer*, will *Sleep* some dayes together, and eat *Nothing*. 746

To restore *Teeth* in *Age*, were *Magnale Naturæ*. It may bee thought of. But howsoever, the *Nature* of the *Teeth* deserveth to be inquired of, as well as the other *Parts* of *Living Creatures Bodies*.

Experiments in Consort, touching *Teeth* and *Hard Substances* in the *Bodies* of *Living Creatures*.

747 There be Five *Parts* in the *Bodies* of *Living-Creatures*, that are of *Hard Substance*; The *Skull*; The *Teeth*; The *Bones*; The *Hornes*; and the *Nailes*. The greatest *Quantity* of *Hard Substance* Continued, is towards the *Head*. For there is the *Skull* of one Entire *Bone*; There are the *Teeth*; There are the *Maxillary Bones*; There is the *Hard Bone*, that is the *Instrument* of *Hearing*; And thence issue the *Hornes*: So that the *Building* of *Living Creatures* Bodies, is like the *Building* of a *Timber-House*, where the *Walls*, and other *Parts* have *Columnes*, and *Beames*; But the *Roofe* is, in the Better Sort of *Houses*, all *Tile*, or *Lead*, or *Stone*. As for *Birds*, they have Three other *Hard Substances* proper to them; The *Bill*, which is of like Matter with the *Teeth*; For no *Birds* have *Teeth*: The *Shell* of the *Egge*: And their *Quills*: For as for their *Spurre*, it is but a *Naile*. But no *Living-Creatures*, that have *Shells* very hard; (As *Oysters*, *Cocles*, *Muscles*, *Scallops*, *Crabs*, *Lobsters*, *Cra-fish*, *Shrimps*, and especially the *Tortoise*,) have *Bones* within them, but onely little *Gristles*.

748 *Bones*, after full Growth, continue at a Stay: And so doth the *Skull*: *Hornes*, in some *Creatures*, are cast, and renued: *Teeth* stand at a Stay, except their Wearing: As for *Nailes*, they grow continually: And *Bills* and *Beakes* will over-grow, and sometimes be cast; As in *Eagles*, and *Parrots*.

749 Most of the *Hard Substances* flie to the *Extremes* of the *Body*; As *Skull*, *Hornes*, *Teeth*, *Nailes*, and *Beakes*: Onely the *Bones* are more *Inward*, and clad with *Flesh*. As for the *Entrailes*, they are all without *Bones*; Save that a *Bone* is (sometimes) found in the *Heart* of a *Stag*; And it may bee in some other *Creature*.

750 The *Skull* hath *Braines*, as a kinde of *Marrow*, within it. The *Backe-Bone* hath one Kinde of *Marrow*, which hath an Affinitie with the *Braine*; And other *Bones* of the *Body* have another. The *Iaw-Bones* have no *Marrow* Severed, but a little *Pulp* of *Marrow* diffused. *Teeth* likewise are thought to

have a kinde of *Marrow* diffused, which causeth the *Sense*, and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Sense*; No more than *Blood*. *Horne* is alike throughout; And so is the *Naile*.

751 None other of the *Hard Substances* have *Sense*, but the *Teeth*: And the *Teeth* have *Sense*, not onely of *Paine*, but of *Cold*.

But we will leave the Enquiries *of other* Hard Substances, *unto their severall Places; And now enquire onely of the* Teeth.

752 The *Teeth* are, in *Men*, of three Kindes: *Sharp*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; And *Pointed-Teeth*, or *Canine*, which are betweene both. But there have beene some *Men*, that have had their *Teeth undivided*, as of one whole *Bone*, with some little Marke in the Place of the Division; As *Pyrrhus* had. Some *Creatures* have *Over-long*, or *Out-growing Teeth*, which we call *Fangs*, or *Tuskes*; As *Boares*, *Pikes*, *Salmons*, and *Dogs*, though lesse. Some *Living Creatures* have *Teeth* against *Teeth*; As *Men*, and *Horses*; And some have *Teeth*, especially their *Master-Teeth*, indented one within another, like *Sawes*; As *Lions*; And so againe have *Dogs*. Some *Fishes* have divers *Rowes* of *Teeth* in the *Rooфes* of of their *Mouthes*; As *Pikes*, *Salmonds*, *Trouts*, &c. And many more in *Salt-Waters*. *Snakes*, and other *Serpents* have *Venomous Teeth*; Which are sometimes mistaken for their *Sting*.

753 No *Beast* that hath *Hornes*, hath *Vpper Teeth*; And no *Beast*, that hath *Teeth* above, wanteth them below: But yet if they be of the same kinde, it followeth not, that if the *Hard Matter* goeth not into *Vpper Teeth*, it will goe into *Hornes*; Nor yet *è converso*; For *Doe's*, that have no *Hornes*, have no *Vpper Teeth*.

754 *Horses* have, at three yeares old, a *Tooth* put forth, which they call the *Colts Tooth*; And at foure yeares old there commeth the *Mark-Tooth*, which hath a *Hole*, as big as you may lay a *Pease* within it; And that weareth shorter and shorter, every yeare; Till that at eight yeares old, the *Tooth* is smooth, and the *Hole* gone; And then they say; *That the Marke is out of the Horses Mouth*.

755 The *Teeth* of *Men* breed first, when the *Childe* is about a yeare and halfe old: And then they cast them, and new come about seven yeares old. But divers have *Backward-Teeth* come forth at Twenty, yea some at Thirty, and Forty. *Quære* of the manner of the *Comming* of them forth. They tell a Tale of the old *Countesse* of *Desmond*, who lived till she was sevenscore-years old, that she did *Dentire* twice, or thrice; Casting her old *Teeth*, and others Comming in their Place.

756 *Teeth* are much hurt by *Sweet-Meats*; And by *Painting* with *Mercury*; And by *Things Over-hot*; And by *Things Over-cold*; And by *Rheumes*. And the *Paine* of the *Teeth*, is one of the sharpest of *Paines*.

757 Concerning *Teeth*, these Things are to bee Considered. 1. The *Preserving* of them. 2. The *Keeping* of them *White*. 3. The *Drawing* of them with *Least Paine*. 4. The *Staying* and *Easing* of the *Tooth-ach*. 5. The *Binding* in of *Artificiall Teeth*, where *Teeth* have been strucken out. 6. And last of all, that Great One, of *Restoring Teeth* in *Age*. The *Instances* that give any likelihood of *Restoring Teeth* in *Age*, are; The *Late Comming* of *Teeth* in some; And the *Renewing* of the *Beakes* in *Birds*, which are Commateriall with *Teeth*. *Quære* therefore more particularly how that commeth. And againe, the *Renewing* of *Hornes*. But yet that hath not beene knowne to have beene provoked by *Art*; Therefore let *Triall* be made, whether *Hornes* may be procured to grow in *Beasts* that are not *Horned*, and how? And whether they

they may be procured to come *Larger* than usuall; As to make an *Oxe*, or a *Deere*, have a *Greater Head* of *Hornes*? And whether the *Head* of a *Deere*, that by *Age* is more *Spitted*, may bee brought againe to be more *Branched*; For these *Trialls*, and the like, will shew, whether by *Art* such *Hard Matter* can be called, and provoked. It may bee tried also, whether *Birds* may not have some thing done to them when they are *Young*, whereby they may bee made to have *Greater*, or *Longer Bills*; Or *Greater*, and *Longer Tallons*? And whether *Children* may not have some *Wash*, or Some thing to make their *Teeth Better*, and *Stronger*? *Corall* is in use as an Help to the *Teeth* of *Children*.

Experiments in Consort, touching the *Generation* and *Bearing* of *Living Creatures* in the *Wombe*.

758

SOme *Living Creatures Generate* but at certaine *Seasons* of the *Yeare*; As *Deere*, *Sheep*, *Wilde Coneyes*, &c. And most Sorts of *Birds*, and *Fishes*: Others at *any time* of the *Yeare*, as *Men*; And all *Domesticke Creatures*; As *Horses*, *Hogs*, *Dogs*, *Cats*, &c. The *Cause* of *Generation* at *all Seasons* seemeth to be *Fulnesse*: For *Generation* is from *Redundance*. This *Fulnesse*, ariseth from two *Causes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moist*, and *Sanguine*; Or from *Plenty* of *Food*. For the first, *Men*, *Horses*, *Dogs*, &c. which breed at all Seasons, are full of *Heat*, and *Moisture*; *Doves* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The *Tame Dove* almost continually. But *Deere* are a *Melancholy Drie Creature*, as appeareth by their *Fearfulnesse*, and the *Hardnesse* of their *Flesh*. *Sheepe* are a *Cold Creature*, as appeareth by their *Mildenesse*, and for that they seldome *Drinke*. Most sort of *Birds* are of a drie *Substance* in comparison of *Beasts*. *Fishes* are cold. For the second *Cause*, *Fulnesse* of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *Wilde*, generate seldome, being *Tame*, generate often; Which is from *Warmth*, and *Fulnesse* of *Food*. We finde, that the Time of *Going* to *Rut* of *Deere* is in *September*; For that they need the whole *Summers Feed* and *Grasse*, to make them fit for *Generation*. And if *Raine* come Earely about the Middle of *September*, they goe to Rut somewhat the sooner; If *Drought*, somewhat the later. So *Sheep*, in respect of their small *Heat*, generate about the same time, or somewhat before. But for the most part, *Creatures* that generate at certaine *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *Winter*, and the *Heat* and *Comfort* of the *Spring* prepareth them. There is also another *Reason*, why some *Creatures* generate at certaine *Seasons*: And that is the *Relation* of their *Time* of *Bearing*, to the time of Generation: For no *Creature* goeth to generate, whilest the *Female* is full; Nor whilest she is busie in *Sitting*, or *Rearing* her *Young*. And therefore it is found by Experience, that if you take the *Egges*, or *Young Ones*, out of the *Neasts* of *Birds*, they will fall to generate againe, three or foure times, one after another.

759

Of *Living Creatures*, some are *longer time* in the *Womb*, and some *Shorter*. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about sixe Moneths; *Doe's* goe about nine Moneths; *Mares* eleven Moneths; *Bitches* nine Weekes; *Elephants* are said to goe two Yeares; For the Received *Tradition* of ten Yeares is *Fabulous*. For *Birds* there is double Enquiry; The *Distance* betweene the *Treading* or *Coupling*, and the *Laying* of the *Egge*; And againe, between the *Egge Layed*, and the *Disclosing* or *Hatching*. And amongst *Birds* there is lesse *Diversitie* of *Time*, than amongst other *Creatures*; yet some there is: For the *Hen* sitteth but three Weekes; The *Turky-Hen*, *Goose*, and *Ducke*, a Moneth: *Quere* of others. The *Cause* is of the great *Difference* of *Times*, amongst *Living Creatures*, is, Either from the *Nature* of the *Kinde*;

Or from the *Constitution* of the *Womb*. For the former, those that are longer in *Comming* to their *Maturity* or *Growth*, are longer in the *Womb*; As is chiefly seene in *Men*; And so *Elephants* which are long in the *Womb*, are long time in *Comming* to their full *Growth*. But in most other Kindes, the *Constitution* of the *Womb*, (that is, the *Hardnesse*, or *Drinesse* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure yeares of *Growth*; And so the *Fawne*; And so the *Calfe*. But *Whelps*, which come to their *Growth* (commonly) within three Quarters of a yeare, are but nine Weekes in the *Womb*. As for *Birds*, as there is lesse Diversitie, amongst them in the time of their *Bringing forth*; So there is lesse Diversitie in the time of their *Growth*; Most of them comming to their *Growth* within a Twelve-Moneth.

760 Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneyes*, &c. Some (ordinarily) but *One*; As *VVomen*, *Lionesses*, &c. This may be caused, either by the *Quantity* of *Sperme* required to the *Producing* One of that Kinde; which if lesse be required, may admit greater Number; If more, fewer: Or by the *Partitions* and *Cells* of the *VVomb*, which may sever the *Sperme*.

Experiments in Consort touching *Species Visible*.

761 THere is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things Coloured*. For like as a *Shilling*, in the *Bottome* of the *VVater*, will shew greater; So will a *Candle* in a *Lanthorne*, in the *Bottome* of the *VVater*. I have heard of a Practice, that *Glo-wormes* in *Glasses* were put in the *VVater*, to make the *Fish* come. But I am not yet informed, whether when a *Diver* Diveth, having his *Eyes* open, and swimmeth upon his *Back*; whether (I say) he seeth *Things* in the *Aire*, greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Object* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Object* in the *Finer*, how it worketh I know not.

762 It would be well boulted out, whether great *Refractions* may not be made upon *Reflexions*, as well as upon *Direct Beames*. For Example, Wee see, that take an *Empty Bason*, put an *Angell* of *Gold*, or what you will, into it; Then goe so farre from the *Bason*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Bason* with *Water*, and you shall see it out of his Place, because of the *Reflexion*. To proceed therefore, put a *Looking-Glasse* into a *Bason* of *Water*; I suppose you shall not see the *Image* in a *Right Line*, or at equall *Angles*, but aside. I know not whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*; Which for *Beautie*, and *Strangenesse*, were a fine Proofe: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cisterne* or *Poole* of *Water*, you shall place over against it a *Picture* of the *Devill*, or what you will, so as you doe not see the *Water*. Then put a *Looking-Glasse* in the *Water*: Now if you can see the *Devills Picture* aside, not seeing the *Water*, it will looke like a *Devill* indeed. They have an old tale in *Oxford*, that *Friar Bacon* walked betweene two *Steeples*: Which was thought to be done by *Glasses*, when he walked upon the *Ground*.

Experiments in Consort, touching *Impulsion*, and *Percussion*.

763 A *Weighty Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, partly because *Motion* doth discusse the *Torpour* of *Solide Bodies*; Which beside their *Motion* of *Gravity*, have in them a *Naturall Appetite*, not to move at all; And partly, because a *Body* that resteth, doth get, by the *Resistance* of the *Body* upon which it resteth, a stronger

Compression

Compreſſion of *Parts*, than it hath of it Selfe: And therefore needeth more Force to be put in *Motion*. For if a *Weighty Body* be Penſile, and hang but by a *Thred*, the *Percuſſion* will make an *Impulſion* very neare as eaſily, as if it were already in *Motion*.

764 A *Body Over-great*, or *Over-ſmall*, will not be throwne ſo farre, as a *Body* of a *Middle Size*: So that (it ſeemeth) there muſt be a *Commenſuration*, or *Proportion*, betweene the *Body Moved*, and the *Force*, to make it move well. The *Cauſe* is, becauſe to the *Impulſion*, there is requiſite the *Force* of the *Body* that *Moveth*, and the *Reſiſtance* of the *Body* that is *Moved*: And if the *Body* be *too great*, it yeeldeth too little; And if it be *too ſmall*, it reſiſteth too little.

765 It is *Common Experience*, that no *Weight* will preſſe or cut ſo ſtrong, being laid upon a *Body*, as Falling, or ſtrucken from above. It may bee the *Aire* hath ſome part in furthering the *Percuſſion*: But the chiefe *Cauſe* I take to be, for that the *Parts* of the *Body Moved*, have by *Impulſion*, or by the *Motion* of *Gravitie continued*, a *Compreſſion* in them, as well downwards, as they have when they are throwne, or Shot thorow the *Aire* forwards. I conceive alſo, that the quicke *Looſe* of that *Motion*, preventeth the *Reſiſtance* of the *Body* below; And *Priority* of the *Force*, (alwayes,) is of great *Efficacie*; As appeareth in infinite *Inſtances*.

Experiment Solitary, touching *Titillation*.

766 *Tickling* is moſt in the *Soles* of the *Feet*, and under the *Arme-Holes*, and on the *Sides*. The *Cauſe* is, the *Thinneſſe* of the *Skin* in thoſe *Parts*; Joyned with the Rareneſſe of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinneſſe* of the *Skin*, and *Suddenneſſe*, and *Rareneſſe* of *Touch*, doe further: For we ſee, a *Feather*, or a *Ruſh*, drawne along the *Lip*, or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuſe*, or a *Touch* more *Hard*, doth not. And for *Suddenneſſe*; Wee ſee no *Man* can tickle himſelfe: We ſee alſo that the *Palme* of the *Hand*, though it hath as *Thin* a *Skin*, as the other *Parts* Mentioned, yet is not Tickliſh, becauſe it is accuſtomed to be Touched. *Tickling* alſo cauſeth *Laughter*. The *Cauſe* may bee, the *Emiſſion* of the *Spirits*, and ſo of the *Breath*, by a *Flight* from *Titillation*; For upon *Tickling*, we ſee there is ever a *Starting*, or *Shrinking* away of the Part, to avoid it; And we ſee alſo, that if you *Tickle* the *Noſtrils* with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emiſſion* of the *Spirits*, that doe likewiſe expell the *Moiſture*. And *Tickling* is ever Painfull, and not well endured.

Experiment Solitary, touching the *Scarcitie* of *Raine* in *Ægypt*.

767 IT is ſtrange, that the *River* of *Nilus*, Over-flowing, as it doth, the *Countrey* of *Ægypt*, there ſhould be nevertheleſſe little or no *Raine* in that *Countrey*. The *Cauſe* muſt be, Either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may bee aſcribed; either unto the *Long Race* of the *Water*: For *Swift Running Waters* vapour not ſo much as *Standing Waters*; Or elſe to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not ſo much, as *Waters Raw*; No more than *Waters* upon the Fire doe vapour ſo much, after ſome time of Boyling, as at the firſt. And it is true, that the *Water* of *Nilus* is ſweeter than other *Waters* in Taſte; And it is excellent Good for the *Stone*, and *Hypochondriacall Melancholy*; Which ſheweth it is *Lenifying*: And it runneth thorow a *Countrey* of a *Hot Climate*, and flat, without Shade, either of *Woods*, or *Hills*; Whereby the *Sunne* muſt needs have great Power to *Concoct* it. As for the *Aire*, (from whence I conceive this want of Showers commeth chiefly;) The *Cauſe*

must be, for that the *Aire* is, of it selfe, *Thin* and *Thirsty*; And as soone as ever it getteth any *Moisture* from the *Water*, it imbibeth, and dissipateth it, in the whole body of the *Aire*; And suffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment Solitary, touching *Clarification*. 768

IT hath beene touched in the *Title* of *Percolations*, (Namely such as are *Inwards*,) that the *Whites* of *Egges*, and *Milke*, doe clarifie; And it is certain, that in *Ægypt*, they prepare and clarifie the *Water* of *Nile*, by putting it into great *Iarres* of *Stone*, and Stirring it about with a few Stamped *Almonds*; Wherewith they also besmeare the Mouth of the *Vessell*; And so draw it off, after it hath rested some time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beere*, or *Must*, to hasten, and perfect the *Clarifying*.

Experiment Solitary, touching *Plants* without *Leaves*. 769

THere be scarce to be found any *Vegetables*, that have *Branches*, and no *Leaves*; except you allow *Corall* for one. But there is also in the *Desarts* of *S. Macario* in *Ægypt*, a *Plant* which is Long, Leavelesse, Browne of Colour, and Branched like *Corall*, save that it closeth at the *Top*. This being set in *Water* within *House*, spreadeth and displayeth strangely; And the People thereabouts have a Superstitious Beleefe, that in the *Labour* of *Women*, it helpeth to the *Easie Deliverance*.

Experiment Solitary, touching the *Materialls* of *Glasse*. 770

THe *Chrystalline Venice Glasse*, is reported to be a Mixture, in equall Portions, of *Stones*, brought from *Pavia*, by the *River Ticinum*; And the *Ashes* of a *Weed*, called by the *Arabs Kall*, which is gathered in a *Desart* betweene *Alexandria*, and *Rosetta*; And is by the *Ægyptians* used first for Fuell; And then they crush the *Ashes* into Lumps, like a *Stone*; And so sell them to the *Venetians* for their *Glasse-works*.

Experiment Solitary, touching *Prohibition* of *Putrefaction*, and the *Long Conservation* of *Bodies*. 771

IT is strange, and well to be noted, how long *Carkasses* have continued *Uncorrupt*, and in their former *Dimensions*; As appeareth in the *Mummies* of *Ægypt*; Having lasted, as is conceived, (some of them,) three thousand yeares. It is true, they finde Meanes to draw forth the *Braines*, and to take forth the *Entrailes*, which are the *Parts* apt est to corrupt. But that is nothing to the Wonder: For we see, what a Soft and corruptible *Substance* the *Flesh*, of all the other *Parts* of the *Body*, is. But it should seeme, that according to our *Observation*, and *Axiome*, in our hundredth *Experiment*, *Putrefaction*, which wee conceave to bee so *Naturall* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that Haste to *Corruption*, that is conceived. And therefore *Bodies*, in *Shining-Amber*; In *Quick-Silver*; In *Balmes*, (whereof we now speake;) In *Wax*; In *Honey*; In *Gummes*; And (it may be) in *Conservatories* of *Snow*; &c. are preserved very long. It need not goe for Repetition, if wee resume againe that which wee said in the aforesaid *Experiment*, concerning *Annihilation*; Namely, that if you provide against three *Causes* of *Putrefaction*, *Bodies* will not corrupt: The First is, that the *Ayre* be *Excluded*; For that undermineth the *Body*, and conspireth with the *Spirit* of the *Bodie* to dissolve it. The Second is, that the *Body Adjacent* and *Ambient*, be not Commateriall, but meerely Heterogeneall towards the Body that is to be preserved: For if nothing can bee received by the One, Nothing can issue from the Other; Such are *Quick-Silver*, and *White-Amber*, to *Herbs*, and *Flies*, and such *Bodies*. The Third is, that the *Body* to be preserved, be not of that *Grosse*, that it may corrupt within it selfe, although no Part of it issue into the *Body Adjacent*: And therefore it must be rather *Thin*,

and

and *Small*, than of *Bulke*. There is a Fourth *Remedie* alſo, which is; That if the *Body* to be preſerved be of *Bulke*, as a *Corps* is, then the *Body* that incloſeth it, muſt have a Vertue to draw forth, and drie the *Moiſture* of the *Inward Body*; For elſe the *Putrefaction* will play within, though Nothing iſſue forth. I remember *Livy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; Whereof the one contained the *Body* of *King Numa*; It being ſome foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Diſcipline* of the *Pontifes*; And that in the *Coffin* that had the *Body*, there was Nothing (at all) to bee ſeene, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Books*, they were found as freſh, as if they had been but newly Written; being written in *Parchment*, and covered over with *Watch-Candles* of *Wax*; three or four fold. By this it ſeemeth, that the *Romans*, in *Numa's* time, were not ſo good *Embalmers*, as the *Egyptians* were; Which was the *Cauſe* that the Body was utterly conſumed. But I finde in *Plutarch*, and Others, that when *Auguſtus Cæſar* viſited the *Sepulchre* of *Alexander* the *Great*, in *Alexandria*, he found the *Body* to keep his *Dimenſion*; But withall, that, notwithſtanding all the *Embalming*, (which no doubt was of the beſt,) the *Body* was ſo Tender, as *Cæſar* touching but the *Noſe* of it, defaced it. Which maketh me finde it very ſtrange, that the *Ægyptian Mummies* ſhould be reported to be as hard as *Stone-Pitch*: For I finde no difference but one; Which indeed may be very Materiall; Namely, that the Ancient *Ægyptian Mummies*, were ſhrowded in a Number of Folds of *Linnen*, beſmeared with *Gums*, in manner of *Seare-Cloth*; Which it doth not appeare was practiſed upon the *Body* of *Alexander*.

NEare the *Caſtle* of *Catie*, and by the *Wells* of *Aſſan*, in the *Land* of *Idumea*, a great Part of the Way, you would thinke the *Sea* were neare hand, though it be a good diſtance off: And it is Nothing, but the *Shining* of the *Nitre*, upon the *Sea-Sands*; Such *Abundance* of *Nitre* the *Shores* there doe put forth.

Experiment Solitary, touching the *Abundance* of *Nitre* in certain *Sea-Shoares*.

772

THe *Dead-Sea*, which vomiteth up *Bitumen*, is of that *Craſſitude*, as *Living Bodies* bound Hand and Foot, caſt into it, have been borne up, and not ſunke. Which ſheweth, that all *Sinking* into *Water*, is but an *Overweight* of the *Bodie*, put into the *Water*, in reſpect of the *Water*: So that you may make *Water* ſo ſtrong, and heavy, of *Quick-Silver*, (perhaps,) or the like, as may beare up *Iron*: Of which I ſee no Uſe, but Impoſture. We ſee alſo, that all *Metalls*, except *Gold*, for the ſame reaſon ſwimme upon *Quicke-Silver*.

Experiment Solitary, touching *Bodies* that are *borne up* by *Water*.

773

IT is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *Blacke-Stone* (whereof *Pilgrims* make Fires,) which burneth like a *Coale*, and diminiſheth not; But onely waxeth Brighter, and Whiter. That it ſhould doe ſo, is not ſtrange; For we ſee *Iron* Red Hot burneth, and conſumeth not: But the Strangeneſſe is, that it ſhould continue any time ſo: For *Iron*, as ſoone as it is out of the Fire, deadeth ſtraight-wayes. Certainly, it were a Thing of great Uſe, and Profit, if you could finde out *Fuell*, that would burne Hot, and yet laſt long: neither am I altogether Incredulous, but there may be ſuch *Candles*, as they ſay are made of *Salamanders Wooll*; Being a Kind of *Minerall*, which whiteneth alſo in the Burning, and conſumeth not. The Queſtion is this; *Flame* muſt be made of ſomewhat; And commonly it is

Experiment Solitary, touching *Fuell*, that *conſumeth little*, or *nothing*.

774

is made of some *Tangible Body*, which hath *Weight*: But it is not impossible, perhaps, that it should be made of *Spirit*, or *Vapour*, in a *Body*; (which *Spirit* or *Vapour* hath no *Weight*;) such as is the Matter of *Ignis Fatuus*. But then you will say, that that *Vapour* also can last but a short time: To that it may be answered, That by the helpe of *Oyle*, and *Wax*, and other *Candle-Stuffe*, the *Flame* may continue, and the *Wicke* not burne.

Experiment Solitary *Oeconomicall* touching *Cheape Fuell*. 775

Sea-Coale last longer than *Char-Coale*; And *Char-Coale* of *Roots*, being coaled into great Peeces, last longer than Ordinary *Char-Coale*. *Turfe* and *Peat*, and *Cow-Sheards*, are cheape *Fuels*, and last long. *Small-Coale*, or *Briar-Coale*, powred upon *Char-Coale*, make them last longer. *Sedge* is a cheap *Fuell* to Brew, or Bake with; the rather because it is good for Nothing else. Triall would be made of some Mixture of *Sea-Coale* with *Earth*, or *Chalke*; For if that *Mixture* be, as the *Sea-Coale-Men* use it, privily, to make the Bulke of the *Coale* greater, it is Deceit; But if it bee used purposely, and bee made knowne, it is Saving.

Experiment Solitary, touching the *Gathering* of *Winde* for *Freshnesse*. 776

IT is, at this Day, in use, in *Gaza*, to couch *Pot-Sheards* or *Vessels* of *Earth*, in their *Walls*, to gather the *Wind* from the Top, and to passe it downe in Spouts into *Roomes*. It is a Device for *Freshnesse*, in great Heats: And it is said, there are some *Roomes* in *Italy*, and *Spaine*, for *Freshnesse*, and *Gathering* the *Winds*, and *Aire*, in the *Heats* of *Summer*. But they be but *Pennings* of the *Winds*, and *Enlarging* them againe, and making them *Reverberate*, and *goe Round* in *Circles*, rather than this *Device* of *Spouts* in the *Wall*.

Experiment Solitary, touching the *Trials* of *Aires*. 777

THere would be used much diligence, in the Choice of some *Bodies*, and *Places*, (as it were,) for the *Tasting* of *Aire*; to discover the *Wholesomenesse*, or *Vnwholesomenesse*, as well of *Seasons*, as of the *Seats* of *Dwellings*. It is certaine, that there be some *Houses*, wherein *Confitures*, and *Pies*, will gather *Mould*, more than in Others. And I am perswaded, that a *Peece* of *Raw Flesh*, or *Fish*, will sooner corrupt in some *Aires*, than in Others. They bee noble *Experiments*, that can make this *Discovery*; For they serve for a *Naturall Divination* of *Seasons*; Better than the *Astronomers* can by their *Figures*: And againe, they teach *Men* where to chuse their *Dwelling*, for their better *Health*.

Experiment Solitary, touching *Increasing* of *Milke* in *Milch Beasts*. 778

THere is a Kinde of *Stone*, about *Bethleem*, which they grinde to *Powder*, and put into *Water*, whereof *Cattell* drinke; Which maketh them give more *Milke*. Surely, there would be some better Trialls made of *Mixtures* of *Water* in *Ponds* for *Cattell*, to make them more *Milch*; Or to *Fatten* them; Or to *Keepe* them from *Murraine*. It may bee, *Chalke*, and *Nitre*, are of the best.

Experiment Solitary, touching *Sand* of the *Nature* of *Glasse*. 779

IT is reported, that in the *Valley*, neare the *Mountaine Carmel*, in *Iudea*, there is a *Sand*, which, of all other, hath most Affinitie with *Glasse*; Insomuch as other *Mineralls*, laid in it, turne to a *Glassie Substance*, without the *Fire*; And againe *Glasse* put into it, turneth into the *Mother-Sand*. The Thing is very strange, if it be true: And it is likeliest to be Caused by some *Naturall Furnace*, or *Heat* in the *Earth*: And yet they doe not speake of any *Eruption* of *Flames*. It were good to trie in *Glasse-Works*, whether the *Crude Materialls* of *Glasse*, mingled with *Glasse*, already made and Re-moulten, doe not facilitate the *Making* of *Glasse* with lesse *Heat*.

In

IN the *Sea*, upon the *South-West* of *Sicily*, much *Corall* is found. It is a *Sub-Marine Plant*. It hath no *Leaves:* It brancheth onely when it is under *Water*; It is *Soft*, and *Greene* of *Colour*; But being brought into the *Aire*, it becommeth *Hard*, and *Shining* Red; as we see. It is said also, to have a *White Berry*; But we finde it not brought over with the *Corall*. Belike it is cast away as nothing worth: Inquire better of it, for the *Discovery* of the *Nature* of the *Plant*.

Experiment Solitary, touching the *Growth* of *Corall*. 780

THe *Manna* of *Calabria* is the best, and in most Plenty. They gather it from the *Leafe* of the *Mulberry Tree*; But not of such *Mulberry Trees*, as grow in the *Valley's*. And *Manna* falleth upon the *Leaves* by *Night*, as other *Deawes* doe. It should seem, that before those *Deawes* come upon *Trees* in the *Valley's*, they dissipate and cannot hold out. It should seeme also, the *Mulberry-Leafe*, it selfe hath some Coagulating Vertue, which inspissateth the *Deaw*, for that it is not found upon other *Trees:* And wee see by the *Silke-Worme*, which feedeth upon that *Leafe*, what a Dainty Smooth *Iuyce* it hath; And the *Leaves* also, (especially of the Blacke *Mulberry*,) are somewhat Bristly, which may helpe to preserve the *Deaw*. Certainly, it were not amisse, to observe a little better, the *Deawes* that fall upon *Trees*, or *Herbs*, Growing on *Mountaines*; For it may bee, many *Deawes* fall, that spend before they come to the *Valley's*. And I suppose, that he that would gather the best *May-Deaw* for *Medicine*, should gather it from the *Hills*.

Experiment Solitary, touching the *Gathering* of *Manna*. 781

IT is said, they have a manner, to prepare their *Greeke-Wines*, to keep them from *Fuming*, and *Inebriating*, by adding some *Sulphur*, or *Allome:* Whereof the one is *Vnctuous*, and the other is *Astringent*. And certaine it is, that those two *Natures* doe best represse *Fumes*. This *Experiment* would be transferred, unto other *Wine*, and *Strong Beere*, by Putting in some like *Substances*, while they worke; Which may make them both to *Fume* lesse, and to *Inflame* lesse.

Experiment Solitary, touching the *Correcting* of *Wine*. 782

IT is conceived by some, (not improbably,) that the reason, why *Wilde-Fires*, (Whereof the principall Ingredient is *Bitumen*,) doe not quench with *Water*, is, for that the first *Concretion* of *Bitumen*, is a *Mixture*, of a *Fiery*, and *Watry Substance:* So is not *Sulphur*. This appeareth, for that in the *Place* neare *Puteoli*, which they call the *Court* of *Vulcan*, you shall heare under the *Earth* a Horrible Thundring of *Fire*, and *Water*, conflicting together: And there breake forth also *Spouts* of *Boyling Water*. Now that *Place* yeeldeth great *Quantities* of *Bitumen*; Whereas *Ætna*, and *Vesuvius*, and the like, which consist upon *Sulphur*, shoot forth *Smoake*, and *Ashes*, and *Pumice*, but no *Water*. It is reported also, that *Bitumen* Mingled with *Lime*, and Put under *Water*, will make, as it were, an *Artificiall Rocke*; The *Substance* becommeth so Hard.

Experiment Solitary, touching the *Materialls* of *Wilde-Fire*. 783

THere is a *Cement*, compounded of *Flower*, *Whites* of *Egges*, and *Stone powdred*, that becommeth Hard as *Marble*; wherewith *Piscina Mirabilis*, neare *Cuma*, is said to have the *Walls* Plastered. And it is certaine, and tried, that the *Powder* of *Load-Stone*, and *Flint*, by the Addition of *Whites* of *Egges*, and *Gumm-Dragon*, made into *Paste*, will in a few dayes harden to the Hardnesse of a *Stone*.

Experiment Solitary, touching *Plaster* growing as *Hard* as *Marble*. 784

It

Experiment Solitary, touching *Iudgement* of the *Cure* in some *Vlcers* and *Hurts*. 785

IT hath beene noted by the *Ancients*, that in *Full*, or *Impure Bodies*, *Vlcers* or *Hurts* in the *Legges*, are Hard to Cure; And in the *Head* more easie. The *Cause* is, for that *Vlcers* or *Hurts* in the *Legges* require *Desiccation*, which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Vlcers* in the *Head* require it not; But contrariwise *Drinesse* maketh them more apt to Consolidate. And in Moderne Observation, the like difference hath beene found, betweene *French-Men*, and *English-Men*; Whereof the ones *Constitution* is more *Drie*, and the others more *Moist*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-Man*, and of the *Legge* in an *English-Man*.

Experiment Solitary, touching the *Healthfulnesse* or *Vnhealthfulnesse* of the *Southerne Winde*. 786

IT hath beene noted by the *Ancients*, that *Southerne Windes*, blowing much, without *Raine*, doe cause a *Fevourous Disposition* of the *Yeare*; But with *Raine*, not. The *Cause* is, for that *Southerne Windes* doe, of themselves, qualifie the *Aire*, to be apt to cause *Fevers*; But when *Showers* are joyned, they doe Refrigerate in Part, and Checke the Sultry *Heat* of the *Southerne Winde*. Therefore this holdeth not in the *Sea-Coasts*, because the *Vapour* of the *Sea*, without *Showers*, doth refresh.

Experiment Solitary, touching *Wounds*. 787

IT hath beene noted by the *Ancients*, that *Wounds* which are made with *Brasse*, heale more easily, than *Wounds* made with *Iron*. The *Cause* is, for that *Brasse* hath, in it selfe, a *Sanative Vertue*; And so in the very Instant helpeth somewhat: But *Iron* is *Corrosive*, and not *Sanative*. And therefore it were good, that the Instruments which are used by *Chirurgions* about *Wounds*, were rather of *Brasse*, than *Iron*.

Experiment Solitary, touching *Mortification* by *Cold*. 788

IN the *Cold Countries*, when Mens *Noses*, and *Eares* are Mortified, and (as it were) Gangrened with *Cold*, if they come to a Fire, they rot off presently. The *Cause* is, for that the few *Spirits*, that remaine in those *Parts*, are suddenly drawne forth, and so *Putrefaction* is made Compleat. But *Snow* Put upon them, helpeth; For that it preserveth those *Spirits* that remaine, till they can revive; And besides, *Snow* hath in it a Secret *Warmth*: As the *Monke* proved out of the *Text*; *Qui dat Nivem sicut Lanam, Gelu sicut Cineres spargit*. Whereby he did inferre, that *Snow* did warme like *Wooll*, and *Frost* did fret like *Ashes*. *Warme Water* also doth good; Because by little and little it openeth the Pores, without any sudden Working upon the *Spirits*. This *Experiment* may bee transferred unto the *Cure* of *Grangrenes*, either comming of themselves, or induced by too much applying of *Opiates*: Wherein you must beware of *Drie Heat*, and resort to Things that are *Refrigerant*, with an Inward *Warmth*, and *Vertue* of Cherishing.

Experiment Solitary, touching *Weight*. 789

WEigh *Iron*, and *Aqua Fortis*, severally; Then dissolve the *Iron* in the *Aqua Fortis*: And weigh the *Dissolution*; And you shall finde it to beare as good *VVeight*, as the *Bodies* did severally: Notwithstanding a good deale of Wast, by a thicke *Vapour*, that issueth during the *VVorking*: Which sheweth that the *Opening* of a *Body*, doth increase the *VVeight*. This was tried once, or twice, but I know not whether there were any *Errour*, in the *Triall*.

Experiment Solitary, touching the *Super-Natation* of *Bodies*. 790

TAke of *Aqua-Fortis* two *Ounces*, of *Quick-Silver* two *Drachmes*, (For that Charge the *Aqua-Fortis* will beare,) The *Dissolution* wil not beare a *Flint*, as big as a *Nutmeg*: Yet (no doubt) the Increasing of the *Weight* of *Water*,

ter will increase his *Power* of *Bearing*; as we see *Broine*, when it is Salt enough, will beare an *Egge*. And I remember well a *Physitian*, that used to give some Mineral *Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe so easily, as in Ordinary *Water*. But it seemeth, the *Weight* of the *Quick-Silver*, more than the *Weight* of a *Stone*, doth not compense the *Weight* of a *Stone*, more than the *Weight* of the *Aqua-Fortis*.

Experiment Solitary, touching the *Flying* of *Vnequall Bodies* in the *Aire*. 791

LEt there be a Body of *Vnequall Weight*; (As of *VVood* and *Lead*, or *Bone* and *Lead*;) If you throw it from you with the *Light-End* forward, it will turne, and the *VVeightier End* will recover to be Forwards; Unlesse the *Body* be Over-long. The *Cause* is, for that the more *Dense Body*, hath a more Violent *Pressure* of the Parts, from the first *Impulsion*; Which is the *Cause*, (though heretofore not found out, as hath beene often said,) of all *Violent Motions*: And when the *Hinder Part* moveth swifter, (for that it lesse endureth *Pressure* of *Parts*,) than the *Forward Part* can make way for it, it must needs be, that the *Body* turn over: For (turned) it can more easily draw forward the *Lighter* Part. *Galilæus* noteth it well; That if an *Open Trough*, wherein *VVater* is, be driven faster then the *VVater* can follow, the *VVater* gathereth upon an heape, towards the *Hinder End*, where the *Motion* began; Which he supposeth, (holding confidently the *Motion* of the *Earth*,) to bee the *Cause* of the *Ebbing* and *Flowing* of the *Ocean*; Because the *Earth* over-runneth the *VVater*. Which *Theory*, though it be false, yet the first *Experiment* is true. As for the *Inequality* of the *Pressure* of *Parts*, it appeareth manifestly in this; That if you take a *Body* of *Stone*, or *Iron*, and another of *VVood*, of the same *Magnitude*, and *Shape*, and throw them with equall Force, you cannot possibly throw the *VVood*, so farre, as the *Stone*, or *Iron*.

Experiment Solitary, touching *Water*, that it may be the *Medium* of *Sounds*. 792

IT is certaine, (as it hath beene formerly, in part, touched,) that *VVater* may be the *Medium* of *Sounds*. If you dash a *Stone* against a *Stone* in the *Bottome* of the *VVater*, it maketh a *Sound*. So a long *Pole* struck upon *Gravell*, in the *Bottome* of the *VVater*, maketh a *Sound*. Nay, if you should thinke that the *Sound* commeth up by the *Pole*, and not by the *VVater*, you shall finde that an *Anchor*, let downe by a *Roape*, maketh a *Sound*; And yet the *Roape* is no Solide *Body*, whereby the *Sound* can ascend.

Experiment Solitary of the *Flight* of the *Spirits* upon *Odious Objects* 793

ALL *Objects* of the *Senses*, which are very *Offensive*, doe cause the *Spirits* to retire; And upon their *Flight*, the *Parts* are (in some degree) destitute; And so there is induced in them a *Trepidation* and *Horrour*. For *Sounds*, we see that the *Grating* of a *Saw*, or any very *Harsh Noise*, will set the *Teeth* on edge, and make all the *Body* Shiver. For *Tastes*, wee see, that in the Taking of a *Potion*, or *Pills*, the *Head*, and the *Necke*, shake. For *Odious Smells*, the like Effect followeth, which is lesse perceived, because there is a Remedy at hand, by Stopping of the *Nose*: But in *Horses*, that can use no such Help, we see the *Smell* of a *Carrion*, especially of a *Dead Horse*, maketh them fly away, and take on, almost as if they were Mad. For *Feeling*, if you come out of the *Sunne*, suddenly, into a *Shade*, there followeth a *Chilnesse* or *Shivering* in all the *Body*. And even in *Sight*, which hath (in effect) no *Odious Object*, Comming into *Sudden Darkenesse*, inducеth an *Offer* to *Shiver*.

Experiment Solitary, touching the *Super-Reflexion* of *Eccho's*. 794

THere is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath Windowes only from above: It is in Length an Hundred Feet, in Breadth Twenty Feet, and in Height neare Fifty; Having a *Doore* in the Middest. It reporteth

porteth the *Voice*, twelve or thirteene times, if you ſtand by the Cloſe *End-Wall*, over againſt the *Doore*. The *Eccho* fadeth, and dyeth by little and little, as the *Eccho* at *Pont-charenton* doth. And the *Voice* ſoundeth, as if it came from above the *Doore*. And if you ſtand at the *Lower End*, or on either *Side* of the *Doore*, the *Eccho* holdeth; But if you ſtand in the *Doore*, or in the *Middeſt* juſt over againſt the *Doore*, not. Note that all *Eccho's* ſound better againſt *Old walls*, than *New*; Becauſe they are more *Drie*, and *Hollow*.

Experiment Solitary, touching the *Force* of *Imagination*, *Imitating* that of the *Senſe*. 795

THoſe *Effects*, which are wrought by the *Percuſſion* of the *Senſe*, and by *Things* in *Fact*, are produced likewiſe in ſome degree, by the *Imagination*. Therefore if a Man ſee another eate *Soure* or *Acide Things*, which ſet the *Teeth* on edge, this *Object* tainteth the *Imagination*. So that he that ſeeth the *Thing* done by another, hath his own *Teeth* alſo ſet on edge. So if a Man ſee another turne ſwiftly, and long; Or if he look upon *Wheeles* that turne, Himſelfe waxeth *Turne-ſick*. So if a Man be upon an *High Place*, without *Railes*, or good Hold, except he be uſed to it, he is Ready to Fall: For *Imagining* a *Fall*, it putteth his *Spirits* into the very *Action* of a *Fall*. So Many upon the *Seeing* of others *Bleed*, or *Strangled*, or *Tortured*, Themſelves are ready to faint, as if they *Bled*, or were in *Strife*.

Experiment Solitary, touching *Preſervation* of *Bodies*. 796

TAke a *Stocke-Gilly-Flower*, and tie it gently upon a Stick, and put them both into a *Stoope Glaſſe*, full of *Quick-ſilver*, ſo that the *Flower* bee covered: Then lay a little *Weight* upon the Top of the *Glaſſe*, that may keepe the Sticke downe; And looke upon them after foure or five dayes; And you ſhall finde the *Flower* Freſh, and the *Stalke* Harder, and leſſe *Flexible*, than it was. If you compare it with another *Flower*, gathered at the ſame time, it will be the more manifeſt. This ſheweth that *Bodies* doe preſerve excellently in *Quick-ſilver*; And not preſerve onely, but, by the *Coldneſſe* of the *Quick-ſilver*, *Indurate*; For the *Freſhneſſe* of the *Flower* may be meerely *Conſervation*; (which is the more to be obſerved, becauſe the *Quick-ſilver* preſſeth the *Flower*;) But the *Stiffeneſſe* of the *Stalke*, cannot be without *Induration*, from the Cold (as it ſeemeth,) of the *Quick-ſilver*.

Experiment Solitary, touching the *Growth*, or *Multiplying* of *Metalls*. 797

IT is reported by ſome of the *Ancients*, that in *Cyprus*, there is a *Kinde* of *Iron*, that being cut into *Little Peeces*, and put into the Ground, if it bee well *Watered*, will increaſe into *Greater Peeces*. This is certaine, and knowne of Old; That *Lead* will multiply, and Increaſe; As hath been ſeene in *Old Statua's* of *Stone*, which have beene put in *Cellars*; The *Feet* of them being bound with *Leaden Bands*; Where (after a time) there appeared, that the *Lead* did ſwell; Inſomuch as it hanged upon the *Stone* like *Warts*.

Experiment Solitary, touching the *Drowning* of the more *Baſe Metall* in the *more Precious*. 798

ICall *Drowning* of *Metals*, when that the *Baſer Metall*, is ſo incorporate with the more *Rich*, as it can by no Meanes bee ſeparated againe: which is a kinde of *Verſion*, though Falſe: As if *Silver* ſhould be inſeparably incorporated with *Gold*; Or *Copper*, and *Lead*, with *Silver*. The Ancient *Electrum* had in it a Fifth of *Silver* to the *Gold*; And made a *Compound Metall*, as fit for moſt uſes, as *Gold*; And more Reſplendent, and more Qualified in ſome other Properties; But then that was eaſily Separated. This to doe privily, or to make the *Compound* paſſe for the *Rich Metall* Simple, is an *Adulteration*, or *Counterfeting*: But if it bee done Avowedly, and without Diſguizing, it may be a great *Saving* of the *Richer Metall*. I remember to have heard of a Man, skilfull in *Metalls*, that a Fifteenth Part of *Silver*, incorparate with

Gold,

Gold, will not be Recovered by any *Water* of *Separation*; Except you put a Greater *Quantitie* of *Silver*, to draw to it the Leſſe; which (hee ſaid) is the laſt Refuge in *Separations*. But that is a tedious way; which no Man (almoſt) will thinke on. This would be better enquired; And the *Quantity* of the Fifteenth turned to a Twentieth; And likewiſe with ſome little *Additionall*, that may further the *Intrinſique Incorporation*. Note that *Silver* in *Gold* will be detected by *Weight*, compared with the *Dimenſion*; But *Lead* in *Silver*, (*Lead* being the *Weightier Metall*,) will not be detected; If you take ſo much the more *Silver*, as will countervaile the *Over-weight* of the *Lead*.

Experiment Solitary, touching *Fixation* of *Bodies*. 799

Gold is the onely *Subſtance*, which hath nothing in it *Volatile*, and yet melteth without much difficultie. The *Melting* ſheweth that it is not Jejune, or Scarce in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Cloſe Coacervation* of them: Whereby they have the leſſe Appetite, and no Meanes (at all) to iſſue forth. It were good therefore to trie, whether *Glaſſe Re-moulten* doe leeſe any *VVeight*? For the *Parts* in *Glaſſe* are evenly Spred; But they are not ſo Cloſe as in *Gold*; As we ſee by the Eaſie Admiſſion of *Light*, *Heat*, and *Cold*; And by the *Smalneſſe* of the *VVeight*. There be other *Bodies*, *Fixed*, which have little, or no *Spirit*: So as there is nothing to fly out; As wee ſee in the *Stuffe*, where of *Coppells* are made; Which they put into *Furnaces*; Upon which *Fire* worketh not: So that there are three *Cauſes* of *Fixation*; The *Even Spreading* both of the *Spirits*, and *Tangible Parts*; The *Cloſeneſſe* of the *Tangible Parts*; And the *Iejuneneſſe* or *Extreme Comminution* of *Spirits*: Of which Three, the two Firſt may bee joyned with a *Nature Liqueſiable*; The Laſt not.

Experiment Solitary, touching the *Reſtleſſe Nature* of Things in *Themſelves*, and their *Deſire* to *Change*. 800

IT is a Profound *Contemplation* in *Nature*, to conſider of the *Emptineſſe*, (as we may call it,) or *Inſatisfaction* of ſeverall *Bodies*; And of their *Appetite* to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smells*, and *Vapours*; And it is moſt manifeſt, that it doth it with a kinde of Thirſt, as not ſatisfied with his owne former Conſiſtence; For elſe it would never receive them in ſo ſuddenly, and eaſily. *VVater*, and all *Liquours*, doe haſtily receive *Drie* and more *Terreſtriall Bodies*, Proportionable: And *Drie Bodies*, on the other ſide, drinke in *VVaters*, and *Liquours*: So that, (as it was well ſaid, by one of the *Ancients*, of *Earthy* and *VVatry Subſtances*,) *One is a Glue to another*, *Parchment*, *Skins*, *Cloth*, &c. drinke in *Liquours*, though themſelves be *Entire Bodies*, and not *Comminuted*, as *Sand*, and *Aſhes*; Not apparently Porous: *Metalls* themſelves doe receive in readily *Strong-waters*; And *Strong-waters* likewiſe doe readily pierce into *Metalls*, and *Stones*: And that *Strong-water* will touch upon *Gold*, that will not touch upon *Silver*; And *è Converſo*. And *Gold*, which ſeemeth by the *VVeight*, to be the Cloſeſt, and moſt Solide *Body*, doth greedily drink in *Quick-Silver*. And it ſeemeth, that this *Reception* of other *Bodies*, is not Violent: For it is (many times) Reciprocall, and as it were with Conſent. Of the *Cauſe* of this, and to what *Axiome* it may bee referred, conſider attentively; For as for the Pretty Aſſertion, that *Matter* is like a *Common Strumpet*, that deſireth all *Formes*, it is but a *VVandring Notion*. Onely *Flame* doth not content it ſelfe to take in any other *Body*; But either to overcome and turne another *Body* into it Selfe, as by Victory; Or it Selfe to dye, and goe out.

Gold will not be Recovered by any manner of Separation; Except you put a Greater Quantity of Silver, to draw to it the Less; which (thereby) is the last Refuge in Separations. But that is a Device, wherein no Man (almost) will think on. This would be better enquired; And the Quantity of the Fifteenth turned to a Twentieth; And likewise with some little Addition, that may further the Separation. Note that Silver in Gold will be detected by Weight, compared with the Dimension. But Lead in Silver, (Lead being the Weightier Metall) will not be detected. If you take so much the more Silver, as will countervail the Overweight of the Lead.

Gold is the only Sufferer, which hath nothing in it Volatil, and yet melteth without much difficulty. The Reason however that it is not Ignited, or Set on Fire, is not Want of Spirit. So that the Fleeing of it, is not Want of Spirit to fly out, but the Equall Spreading of the Fixed Parts, and the Close Cleaving of them: Whereby they have the less Appetite, and no Means (at all) to issue forth. It were good therefore to try, whether Gold (by Medicine) may not be made Volatile? For the Parts in Gold are evenly Spread; But they are not so Close as in Gold; As we see by the Easie Admission of Light, Heat, and Cold; And by the Swelling of the Volatile. There be other Bodies, Fixed, which have little, or no Spirit: So as there is nothing to fly out; As we see in the Stuffe, where of Crucibles are made; Which they put into Furnaces; Upon which Fire worketh not: So that there are three Causes of Fixation; The Even Spreading both of the Spirit and Volatile Part; The Closeness of the Volatile Part; And the Not Separation of Common Humour of Spirit: Of which Three, the two First may be Joyned with a Nature Volatile; The Last not.

IT is a Profound Contemplation in Nature; (and Founder of the Empirique, (as we may call it,) or Imitation of several Bodies; And of their Appetite to take in Others. Any taketh in Light, and Sound, and Smell, and Vapours; And it is most manifest, that it doth it with a kinde of Thirst, as not Satisfied with his owne former Condition; For else it would never receive them in so Suddenly, and eagerly. Water, and all Liquours, doe greatly receive Dye and more Terrestrial Bodies, Proportionable: And Dye Bodies on the other side, drinke in Water, and Liquours: So that (as it was well said by one of the Ancients, of Envy and Envious Sufferers) One is a Glas to another, Parchment, Skin, Cloth, &c. drinke in Liquours, though themselves be Entire Bodies, and not Consumed, as Sand, and Ashes; Not apparently Porous: Metalls themselves doe receive in readily Strong-waters. And Strong-waters likewise doe readily pierce into Metall, and Stones: And that Strong-waters will touch upon Gold, that will not touch upon Silver; And Copper. And Gold, which feeleth by the Weight, to be the Closest, and most Solide Body, doth greedily drink in Quick-Silver. And it seemeth, that this Reception of other Bodies, is not Violent: For it is (many times) Recall, and as it were with Consent. Of the Cause of this, and to what Adventure it may be referred, consider attentively; For as for the Poetry Assertion, that Matter is like a Common Strumpet, that defileth all Forms, it is but a Wandring Notion. Only Flame doth not consent it selfe to take in any other Body; But either to overcome and turne another Body into it selfe, as by Victory; Or it selfe to dye, and goe out.

NATVRALL HISTORIE.

IX. Century.

IT is certaine, that all *Bodies* whatsoever, though they have no *Sense*, yet they have *Perception*: For when one *Body* is applyed to another, there is a Kinde of *Election*, to embrace that which is Agreeable, and to exclude or expell that which is Ingrate: And whether the *Body* be *Alterant*, or *Altered*, evermore a *Perception* precedeth *Operation*: For else all *Bodies* would be alike One to Another. And sometimes this *Perception*, in some Kinde of *Bodies*, is farre more Subtill than the *Sense*; So that the *Sense* is but a dull thing in Comparison of it: Wee see a *Weather-Glasse*, will finde the least difference of the *Weather*, in *Heat*, or *Cold*, when Men finde it not. And this *Perception* also, is sometimes at *Distance*, as well as upon the *Touch*; As when the *Load-Stone* draweth *Iron*; or *Flame* fireth *Naphtha* of *Babylon*, a great distance off. It is therefore a *Subject* of a very *Noble Enquiry*, to enquire of the more *Subtill Perceptions*; For it is another Key to open *Nature*, as well as the *Sense*; And sometimes Better. And besides, it is a Principall *Meanes* of *Naturall Divination*; For that which in these *Perceptions* appeareth early, in the great *Effects* commeth long after. It is true also, that it serveth to *discover* that which is *Hid*, as well as to *foretell* that which is to *Come*;

Experiments in Consort, touching *Perception* in *Bodies Insensible*, tending to *Naturall Divination*, or *Subtill Trialls*.

Come; As it is in many *Subtill Trialls*; As to trie whether *Seeds* be old, or new, the *Sense* cannot informe: But if you boile them in *Water*, the New *Seeds* will sprout sooner: And so of *Water*, the *Taste* will not discover the best *Water*; but the *Speedy Consuming* of it, and many other *Meanes*, which wee have heretofore set downe, will discover it. So in all *Physiognomy*, the *Lineaments* of the *Body* will discover those *Naturall Inclinations* of the *Minde*, which *Dissimulation* will conceale, or *Discipline* will suppresse. Wee shall therefore now handle onely, those two *Perceptions*, which pertaine to *Naturall Divination*, and *Discovery*: Leaving the Handling of *Perception* in other Things, to be disposed Elsewhere. Now it is true, that *Divination* is attained by other *Meanes*; As if you know the *Causes*; If you know the *Concomitants*; you may judge of the *Effect* to follow: And the like may be said of *Discovery*; But we tie our Selves here, to that *Divination* and *Discovery* chiefly, which is Caused by an *Early*, or *Subtill Perception*.

The *Aptnesse* or *Propension* of *Aire*, or *Water*, to Corrupt or Putrifie, (no doubt,) is to be found before it breake forth into manifest *Effects* of *Diseases*, *Blasting*, or the like. Wee will therefore set downe some *Prognosticks* of *Pestilentiall* and *Unwholesome Yeares*.

801 The *Wind* blowing much from the *South*, without *Raine*; And *Wormes* in the *Oake-Apple*; have beene spoken of before. Also the *Plenty* of *Frogs*, *Grashoppers*, *Flies*, and the like *Creatures* bred of *Putrefaction*, doth portend *Pestileniiall Yeares*.

802 *Great*, and *Early Heats* in the *Spring*, (and namely in *May*,) without *Winds*, portend the same; And generally so doe *Yeares* with little *Wind*, or *Thunder*.

803 *Great Droughts* in *Summer*, lasting till towards the *End* of *August*, and some *Gentle Showres* upon them; And then some *Drie Weather* againe; Doe portend a *Pestilent Summer*, the *Yeare* following: For about the *End* of *August*, all the *Sweetnesse* of the *Earth*, which goeth into *Plants*, and *Trees*, is exhaled; (And much more if the *August* be drie;) So that nothing then can breathe forth of the *Earth*, but a grosse *Vapour*, which is apt to Corrupt the *Aire*: And that *Vapour*, by the first *Showres*, if they be *Gentle*, is released, and commeth forth abundantly. Therefore they that come abroad soone after those *Showres*, are commonly taken with *Sickenesse*: And in *Affricke*, no Body will stirre out of doores, after the first *Showres*. But if the first *Showres* come vehemently, then they rather wash and fill the *Earth*, than give it leave to breathe forth presently. But if *Drie Weather* come againe, then it fixeth and continueth the *Corruption* of the *Aire*, upon the first *Showres* begun; And maketh it of ill *Influence*, even to the Next *Summer*; Except a very *Frostie Winter* discharge it; Which seldome succeedeth such *Droughts*.

804 The *Lesser Infections*, of the *Small Pocks*, *Purple Feavers*, *Agues*, in the *Summer*

mer Precedent, and hovering all *Winter*, doe portend a great *Peſtilence* in the *Summer* following; For *Putrefaction* doth not riſe to his height at once.

805 It were good to lay a *Peece* of *Raw Fleſh*, or *Fiſh*, in the *Open Aire*; And if it Putrefie quickly, it is a *Signe* of a *Diſpoſition* in the *Aire* to *Putrefaction*. And becauſe you cannot be informed, whether the *Putrefaction* be quicke or late, except you compare this *Experiment* with the like *Experiment* in another *Yeare*, it were not amiſſe in the ſame *Yeare*, and at the ſame *Time*, to lay one *Peece* of *Fleſh*, or *Fiſh*, in the *Open Aire*, and another of the ſame Kinde and Bigneſſe, within *Doores*: For I Judge, that if a generall *Diſpoſition* be in the *Aire* to Putrefie, the *Fleſh*, or *Fiſh*, will ſooner Putrefie abroad, where the *Aire* hath more power, than in the *Houſe*, where it hath leſſe, being many wayes corrected. And this *Experiment* would be made about the *End* of *March*: For that *Seaſon* is likeſt to diſcover, what the *Winter* hath done; And what the *Summer* following will doe upon the *Aire*. And becauſe the *Aire* (no doubt) receiveth great *Tincture*, and *Infuſion* from the *Earth*; It were good to trie that *Expoſing* of *Fleſh*, or *Fiſh*, both upon a *Stake* of *Wood*, ſome height above the *Earth*, and upon the *Flat* of the *Earth*.

806 Take *May-Dew*, and ſee whether it putrefie quickly, or no? For that likewiſe may diſcloſe the *Quality* of the *Aire*, and *Vapour* of the *Earth*, more or leſſe *Corrupted*.

807 A *Drie March*, and a *Drie May*, portend a *Wholeſome Summer*, if there bee a *Showring April* betweene: But otherwiſe, it is a *Signe* of a *Peſtilentiall Yeare*.

808 As the *Diſcoverie* of the *Diſpoſition* of the *Aire*, is good for the *Prognoſticks* of *Wholeſome*, and *Vnwholeſome Yeares*; So it is of much more uſe, for the *Choice* of *Places* to dwell in: At the leaſt, for *Lodges*, and *Retiring Places* for *Health*; (For *Manſion Houſes* reſpect *Proviſions*, as well as *Health*;) Wherein the *Experiments* above mentioned may ſerve.

809 But for the *Choice* of *Places*, or *Seats*, it is good to make Triall, not onely of *Aptneſſe* of *Aire* to corrupt, but alſo of the *Moiſture* and *Drineſſe* of the *Aire*; and the *Temper* of it, in *Heat*, or *Cold*; For that may concerne *Health* diverſly. We ſee that there be ſome *Houſes*, wherein *Sweet Meats* will relent, and *Baked Meats* will mould, more than in others; And *Wainſcoats* will will alſo ſweat more; ſo that they will almoſt runne with *Water*: All which, (no doubt,) are cauſed chiefly by the *Moiſtneſſe* of the *Aire*, in thoſe *Seats*. But becauſe it is better to know it, before a *Man* buildeth his *Houſe*, than to finde it after, take the *Experiments* following.

810 Lay *Wooll*, or a *Sponge*, or *Bread*, in the *Place* you would trie, comparing it with ſome other *Places*; And ſee whether it doth not moiſten, and make the *Wooll*, or *Sponge*, &c. more Ponderous, than the other? And if it doe, you may judge of that Place, as Situate in a *Groſſe*, and *Moiſt Aire*.

811 Becauſe it is certaine, that in ſome *Places*, either by the *Nature* of the *Earth*, or by the *Situation* of *Woods*, and *Hills*, the *Aire* is more Unequall, than in Others; And *Inequalitie* of *Aire* is ever an Enemy to *Health*; It were good to take two *Weather-Glaſſes*, Matches in all things, and to ſet them, for the ſame Houres of One day, in ſeverall *Places*, where no *Shade* is, nor *Encloſures*: And to marke when you ſet them, how farre the *Water* commeth; And to compare them, when you come againe, how the *VVater* ſtandeth then: And if you finde them *Vnequall*, you may be ſure that the *Place* where the *VVater* is loweſt, is in the *VVarmer Aire*, and the other in the *Colder*. And the greater the *Inequalitie* be, of the *Aſcent*, or *Deſcent* of the *VVater*, the greater is the *Inequalitie* of the *Temper* of the *Aire*.

812 The *Predictions* likewise of *Cold* and *Long VVinters*, and *Hot* and *Drie Summers*, are good to be knowne; As well for the *Discovery* of the *Causes*, as for divers *Provisions*. That of *Plenty* of *Hawes* and *Heps*, and *Briar-Berries*, hath beene spoken of before. If *VVainscoat*, or *Stone*, that have used to Sweat, be more drie in the Beginning of *VVinter*; Or the *Drops* of the *Eaves* of *Houses* come more slowly downe, than they use; it portendeth a *Hard* and *Frostie VVinter*. The *Cause* is, for that it sheweth an *Inclination* of the *Aire*, to *Drie VVeather*; which in *Winter* is ever joyned with *Frost*.

813 Generally, a *Moist* and a *Coole Summer*, portendeth a *Hard VVinter*. The *Cause* is, for that the *Vapours* of the *Earth*, are not dissipated in the *Summer*, by the *Sunne*; And so they rebound upon the *VVinter*.

814 A *Hot* and *Drie Summer*, and *Autumne*, and especially if the *Heat* and *Drought* extend farre into *September*, portendeth an Open Beginning of *VVinter*; And *Colds* to succeed, toward the latter Part of the *VVinter*, and the Beginning of the *Spring*: For till then, the former *Heat* and *Drought* beare the Sway; And the *Vapours* are not sufficiently Multiplied.

815 An *Open* and *VVarme VVinter* portendeth a *Hot* and *Drie Summer*: For the *Vapours* disperse into the *VVinter Showers*; Whereas *Cold* and *Frost* keepeth them in, and transporteth them into the late *Spring*, and *Summer* following.

816 *Birds* that use to change *Countries*, at certaine *Seasons*, if they come Earlier, doe shew the *Temperature* of *VVeather*, according to that *Countrie* whence they came: As the *VVinter-Birds*, (namely, *VVoodcocks*, *Feldefares*, &c.) if they come earlier, and out of the *Northerne Countries*, with us shew *Cold VVinters*. And if it be in the same *Country*, then they shew a *Temperature* of *Season*, like unto that *Season* in which they come: As *Swallowes*, *Bats*, *Cuckoes*, &c. that come towards *Summer*, if they come early, shew a *Hot Summer* to follow.

817 The *Prognosticks*, more Immediate, of *VVeather* to follow soone after, are more Certaine than those of *Seasons*. The *Resounding* of the *Sea* upon the *Shoare*; And the *Murmur* of *VVinds* in the *VVoods*, without apparent *VVind*; shew *VVind* to follow: For such *VVinds*, breathing chiefly out of the *Earth*, are not at the first perceived, except they be pent, by *VVater*, or *VVood*. And therefore a *Murmur* out of *Caves* likewise portendeth as much.

818 The *Vpper Regions* of the *Aire*, perceive the *Collection* of the *Matter* of *Tempest*, and *VVinds*, before the *Aire* here below: And therefore the *Obscuring* of the *Smaller Starres* is a *Signe* of *Tempests* following. And of this kind you shall finde a Number of *Instances* in our *Inquisition De Ventis*.

819 *Great Mountaines* have a *Perception* of the *Disposition* of the *Aire* to *Tempests*, sooner than the *Valley's* or *Plaines* below: And therefore they say in *VVales*, when certaine *Hills* have their *Night-Caps* on, they meane Mischiefe. The *Cause* is, for that *Tempests*, which are for the most part bred above, in the *Middle Region*, (as they call it,) are soonest perceived to collect in the *Places* next it.

820 The *Aire*, and *Fire*, have *Subtill Perceptions* of *VVind Rising*, before *Men* finde it. We see the *Trembling* of a *Candle* will discover a *VVind* that otherwise we doe not feele; And the *Flexuous Burning* of *Flames* doth shew the *Aire* beginneth to be unquiet; And so doe *Coales* of *Fire* by casting off the *Ashes* more then they use. The *Cause* is, for that no *VVind*, at the first, till it hath strooke and driven the *Aire*, is Apparent to the *Sense*: But *Flame* is easier to move, than *Aire*: And for the *Ashes*, it is no marvell, though *VVind* unperceived shake them off; For wee usually trie, which way the *VVind* bloweth,

bloweth, by casting up *Grasse*, or *Chasse*, or such light things into the *Aire*.

When *Wind* expireth from under the *Sea*; As it causeth some *Resounding* of the *Water*, (whereof we spake before,) so it causeth some *Light Motions* of *Bubbles*, and *White Circles* of *Froth*. The *Cause* is, for that the *Wind* cannot be perceived by the *Sense*, untill there be an *Eruption* of a great *Quantity*, from under the *Water*; And so it getteth into a *Body*: Whereas in the first *Putting up* it commeth in little Portions. 821

We spake of the *Ashes*, that *Coales* cast off; And of *Grasse*, and *Chasse* carried by the *Wind*; So any *Light Thing* that moveth, when we finde no *Wind*, sheweth a *Wind* at hand: As when *Feathers*, or *Downe* of *Thistles*, fly to and fro in the *Aire*. 822

For *Prognosticks* of *VVeather* from *Living Creatures*, it is to be noted; That *Creatures* that live in the *Open Aire*, (*Sub Dio*,) must needs have a Quicker *Impression* from the *Aire*, than *Men* that live most within *Doores*; And especially *Birds* who live in the *Aire*, freest, and Cleerest; And are aptest by their *Voice* to tell Tales, what they finde; And likewise by the *Motion* of their *Flight* to expresse the same.

Water-Fowles, (as *Sea-Gulls*, *More-Hens*, &c.) when they flocke and flie together, from the *Sea* towards the *Shores*; And contrariwise, *Land-Birds*, (as *Crowes*, *Swallowes*, &c.) when they fly from the *Land* to the *Waters*, and beat the *Waters* with their *Wings*; doe fore-shew *Raine*, and *Wind*. The *Cause* is, *Pleasure*, that both Kindes take in the *Moistnesse*, and *Densitie* of the *Aire*: And so desire to be in *Motion*, and upon the *Wing*, whithersoever they would otherwise goe: For it is no Marvell, that *Water-Fowle* doe joy most in that *Aire*, which is likest *Water*; And *Land-Birds*, also, (many of them,) delight in *Bathing*, and *Moist Aire*. For the same Reason also, many *Birds* doe proine their *Feathers*; And *Geese* doe gaggle; And *Crowes* seeme to call upon *Raine*: All which is but the Comfort they seeme to receive in the *Relenting* of the *Aire*. 823

The *Heron*, when she soareth high, (so as sometimes she is seene to passe over a *Cloud*,) sheweth *Winds*: But *Kites* flying aloft, shew *Faire* and *Drie Weather*. The *Cause* may be, for that they both mount most into the *Aire*, of that Temper, wherein they delight: And the *Heron*, being a *Water-Fowle*, taketh pleasure in the *Aire*, that is Condensed: And besides, being but Heavy of *Wing*, needeth the Help of the *Grosser Aire*. But the *Kite* affecteth not so much the *Grossenesse* of the *Aire*, as the *Cold* and *Freshnesse* thereof; For being a *Bird* of *Prey*, and therefore *Hot*, she delighteth in the *Fresh Aire*; And (many times) flyeth against the *Wind*; As *Trouts*, and *Salmons* swimme against the Streame. And yet it is true also, that all *Birds* finde an Ease in the depth of the *Aire*; As *Swimmers* doe in a Deepe *Water*. And therefore when they are aloft, they can uphold themselves with their *Wings Spred*, scarce moving them. 824

Fishes, when they play towards the *Top* of the *Water*, doe commonly foretell *Raine*. The *Cause* is, for that a *Fish* hating the *Drie*, will not approach the *Aire*, till it groweth *Moist*; And when it is *Dry*, will fly it, and *Swimme* lower. 825

Beasts doe take Comfort, (generally,) in a *Moist Aire*; And it maketh them eat their *Meat* better: And therefore *Sheepe* will get up betimes in the 826

the Morning, to feed, against *Raine:* And *Cattell*, and *Deere*, and *Conneys*, will feed hard before *Raine:* And a *Heifer*, will put up his *Nose*, and snuffe in the *Aire*, against *Raine*.

827 The *Trifoile*, against *Raine*, swelleth in the *Stalke*; and so standeth more upright; For by *Wet*, *Stalkes* doe erect, and *Leaves* bow downe. There is a Small Red *Flower* in the *Stubble-Fields*, which Countrey People call the *Wincopipe*; Which if it open in the *Morning*, you may be sure of a faire *Day* to follow.

828 Even in *Men*, *Aches*, and *Hurts*, and *Cornes*, doe engrieve, either towards *Raine*, or towards *Frost:* For the One maketh the *Humours* more to Abound; And the Other maketh them Sharper. So we see both *Extremes* bring the *Gout*.

829 *Wormes*, *Vermine*, &c. doe fore-shew (likewise) *Raine:* For *Earth-Wormes* will come forth, and *Moules* will cast up more; and *Fleas* bite more, against *Raine*.

830 *Solide Bodies* likewise fore-shew *Raine*. As *Stones*, and *Wainscot*, when they *Sweat:* And *Boxes*, and *Pegges* of *Wood*, when they Draw, and *Wind hard*; Though the Former be but from an Outward Cause; For that the *Stone*, or *Wainscot*, turneth and beateth back the *Aire* against it selfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it selfe.

Experiment Solitary, touching the *Nature* of *Appetite* in the *Stomach*.

831 *Appetite* is moved chiefly by Things that are *Cold*, and *Dry*; The *Cause* is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth upon Supply; And so is *Drinesse*: And therefore all *Soure Things*, (as *Vinegar*, *Iuyce* of *Limons*, *Oyle* of *Vitriol*, &c.) provoke *Appetite*. And the *Disease* which they call *Appetitus Caninus*, consisteth in the *Matter* of an *Acide* and *Glassy Flegme*, in the *Mouth* of the *Stomach*. *Appetite* is also moved by *Soure Things*; For that *Soure Things*, induce a *Contraction* in the *Nerves*, placed in the *Mouth* of the *Stomach*; which is a great *Cause* of *Appetite*. As for the *Cause*, why *Onyons*, and *Salt*, and *Pepper*, in Baked Meats, move *Appetite*, it is by *Vellication* of those *Nerves*; For *Motion* whetteth. As for *Worme Wood*, *Olives*, *Capers*, and others of that kinde, which participate of *Bitternesse*, they move *Appetite* by *Abstersion*. So as there bee foure Principall *Causes* of *Appetite*; The *Refrigeration* of the *Stomach* joyned with some *Drinesse*; *Contraction*; *Vellication*; And *Abstersion:* Besides *Hunger*, which is an *Emptinesse:* And yet *Over-Fasting* doth (many times) cause the *Appetite* to cease; For that *Want* of *Meat* maketh the *Stomach* draw *Humours*; And such *Humours* as are Light, and Cholericke, which quench *Appetite* most.

Experiment Solitary, touching *Sweetnesse* of *Odour* from the *Rainbow*.

832 It hath beene observed by the *Ancients*, that where a *Raine-Bow* seemeth to hang over, or to touch, there breatheth forth a *Sweet Smell*. The *Cause* is, for that this happeneth but in certain Matters, which have in themselves some *Sweetnesse*; Which the *Gentle Dew* of the *Raine-Bow* doth draw forth: And the like doe *Soft Showers*; For they also make the *Ground* Sweet: But none are so delicate as the *Dew* of the *Rain-Bow*, where it falleth. It may be also, that the *Water* it selfe hath some *Sweetnesse:* For the *Raine-Bow* consisteth of a *Glomeration* of *Small Drops*, which cannot possibly fall, but from the *Aire*, that is very *Low:* And therefore may hold the very *Sweetnesse* of the *Herbs*, and *Flowers*, as a *Distilled Water:* For *Raine*, and other *Dew*, that fall from high, cannot preserve the Smell, being dissipated in the drawing up: neither doe we know, whether some *Water* it selfe may not have some degree of *Sweetnesse*. It is true, that wee finde it sensibly in no *Poole*, *River*, nor

nor *Fountaine*; But good *Earth*, newly turned up, hath a *Freſhneſſe*, and good *Sent*; Which *water*, if it be not too *Equall*, (For *Equall Objects* never move the *Senſe*,) may alſo have. Certaine it is, that *Bay-Salt*, which is but a kinde of *Water Congealed*, will ſometimes ſmell like *Violets*.

Experiment Solitary, touching *Sweet Smells*. 833

TO *Sweet Smells Heat* is requiſite, to Concoct the *Matter*; And ſome *Moiſture* to Spread the *Breath* of them. For *Heat*, we ſee that *Woods*, and *Spices*, are more *Odorate* in the *Hot Countries*, than in the *Cold*: For *Moiſture*, wee ſee that Things too much Dried, loſe their *Sweetneſſe*: And *Flowers* growing, ſmell better in a *Morning*, or *Evening*, than at *Noone*. Some *Sweet Smells* are deſtroyed by Approach to the *Fire*; As *Violets*, *Wall-Flowers*, *Gilly-Flowers*, *Pincks*; And generally all *Flowers* that have *Coole* and *Delicate Spirits*. Some continue both on the *Fire*, and from the *Fire*; As *Roſe-Water*, &c. Some doe ſcarce come forth, or at leaſt not ſo pleaſantly, as by means of the *Fire*; as *Iuniper*, *Sweet Gums*, &c. And all *Smells*, that are Encloſed in a *Faſt Body*: But (generally) thoſe *Smells* are the moſt Gratefull, where the *Degree* of *Heat* is Small; Or where the *Strength* of the *Smell* is allayed; For theſe *Things* doe rather wooe the *Senſe*, than Satiate it. And therefore the *Smell* of *Violets*, and *Roſes* exceedeth in *Sweetneſſe* that of *Spices*, and *Gummes*; And the Strongeſt Sort of *Smells*, are beſt in a weſt, afarre off.

Experiment Solitary, touching the *Corporeall Subſtance* of *Smells*. 834

IT is certaine, that no *Smell* iſſueth, but with *Emiſſion* of ſome *Corporeall Subſtance*; Not as it is in *Light*, and *Colours*, and in *Sounds*. For we ſee plainly, that *Smell* doth ſpread nothing that diſtance, that the other doe. It is true, that ſome *Woods* of *Orenges*, and *Heathes* of *Roſe-Mary*, will Smell a great way into the *Sea*, perhaps twenty Miles; But what is that, ſince a *Peale* of *Ordnance* will doe as much, which moveth in a ſmall compaſſe? Whereas thoſe *Woods*, and *Heathes*, are of Vaſt Spaces: Beſides, we ſee that *Smells* doe adhere to *Hard Bodies*; As in *Perfuming* of *Gloves*, &c. which ſheweth them *Corporeall*; And doe Laſt a great while, which *Sounds*, and *Light* doe not.

Experiment Solitary, touching *Fetide* and *Fragrant Odours*. 835

THe *Excrements* of moſt *Creatures* Smell ill; Chiefly to the ſame *Creature* that voideth them: For we ſee, beſides that of *Man*, that *Pigeons*, and *Horſes* thrive beſt, if their *Houſes*, and *Stables* be kept Sweet; And ſo of *Cage-Birds*: And the *Cat* buryeth that which ſhe voideth: And it holdeth chiefly in thoſe *Beaſts*, which feed upon *Fleſh*. *Dogs* (almoſt) onely of *Beaſts* delight in *Fetide Odours*; Which ſheweth there is ſomewhat in their *Senſe* of *Smell*, differing from the *Smells* of other *Beaſts*. But the *Cauſe*, why *Excrements* ſmell ill, is manifeſt; For that the *Body* it ſelfe rejecteth them; Much more the *Spirits*: And wee ſee, that thoſe *Excrements* that are of the *Firſt Digeſtion*, Smell the worſt; As the *Excrements*, from the *Belly*: Thoſe that are from the *Second Digeſtion*, leſſe ill; As *Vrine*; And thoſe that are from the *Third*, yet leſſe; For *Sweat* is not ſo bad, as the other two; Eſpecially of ſome *Perſons*, that are full of *Heat*. Likewiſe moſt *Putrefactions* are of an *Odious Smell*: For they ſmell either *Fetide*, or *Mouldy*. The *Cauſe* may bee, for that *Putrefaction* doth bring forth ſuch a *Conſiſtence*, as is moſt Contrary to the *Conſiſtence* of the *Body*, whileſt it is Sound: For it is a meere diſſolution of that *Forme*. Beſides, there is another Reaſon which is Profound: And it is, that the *Objects* that pleaſe any of the *Senſes*, have (all) ſome *Equalitie*, and (as it were) *Order* in their *Compoſition*: But where thoſe are wanting, the *Object* is ever Ingrate. So *Mixture* of many *Diſagreeing Colours* is

is ever unpleasant to the *Eye*: *Mixture* of *Discordant Sounds* is unpleasant to the *Eare*: *Mixture*, or *Hotch-Potch* of many *Tastes*, is unpleasant to the *Taste*: *Harshnesse* and *Ruggednesse* of *Bodies*, is unpleasant to the *Touch*: Now it is certaine, that all *Putrefaction*, being a *Dissolution* of the first *Forme*, is a meere *Confusion*, and *Vnformed Mixture* of the *Part*. Nevertheless, it is strange, and seemeth to Crosse the former *Observation*, that some *Putrefactions* and *Excrements* doe yeeld excellent *Odours*; As *Civet*, and *Muske*; And as some thinke *Amber-Greece*: For divers take it, (though unprobably,) to come from the *Sperme* of *Fish*: And the *Mosse* we spake off from *Apple-Trees*, is little better than an *Excretion*. The Reason may be, for that there passeth in the *Excrements*, and remaineth in the *Putrefactions*, some good *Spirits*; especially where they proceed from *Creatures*, that are very *Hot*. But it may bee also joyned with a further *Cause*, which is more Subtill; And it is, that the *Senses* love not to be Over-pleased; But to have a *Commixture* of somewhat that is in it selfe Ingrate. Certainly, we see how *Discords* in *Musicke*, falling upon *Concords*, make the *Sweetest Straines*: And wee see againe, what Strange *Tastes* delight the *Taste*; As *Red-Herrings*, *Caviary*, *Parmizan*, &c. And it may be, the same holdeth in *Smells*. For those kinde of *Smells*, that wee have mentioned, are all Strong, and doe Pull and Vellicate the *Sense*. And we finde also, that *Places* where Men *Vrine*, commonly have some *Smell* of *Violets*: And *Vrine*, if one hath eaten *Nutmeg*, hath so too.

The Sloathfull, Generall, and Indefinite *Contemplations*, and *Notions*, of the *Elements*, and their *Conjugations*; Of the *Influences* of *Heaven*; Of *Heat*, *Cold*, *Moisture*, *Drought*, *Qualities Active*, *Passive*; and the like; have swallowed up the true *Passages*, and *Processes*, and *Affects*, and *Consistences* of *Matter*, and *Naturall Bodies*. Therefore they are to bee set aside, being but *Notionall*, and *ill Limited*; And Definite *Axiomes* are to bee drawne out of *Measured Instances*: And so Assent to be made to the more *Generall Axiomes*, by *Scale*. And of these Kindes of *Processes* of *Natures*, and *Characters* of *Matter*, we will now set downe some *Instances*.

Experiment Solitary, touching the *Causes* of *Putrefaction*.

836

ALL *Putrefactions* come chiefly from the *Inward Spirits* of the *Body*; And partly also from the *Ambient Body*, be it *Aire*, *Liquour*, or whatsoever else. And this last, by two *Means*: Either by *Ingresse* of the *Substance* of the *Ambient Bodie*, into the *Body Putrified*; Or by *Excitation* and *Sollicitation* of the *Body Putrified*, and the *Parts* thereof, by the *Body Ambient*. As for the Received Opinion, that *Putrefaction* is caused, either by *Cold*, or *Peregrine* and *Preternaturall Heat*, it is but Nugation: For *Cold* in *Things Inanimate*, is the greatest Enemy that is, to *Putrefaction*; though it extinguisheth *Vivification*, which ever consisteth in *Spirits Attenuate*, which the *Cold* doth congeale, and coagulate. And as for the *Peregrine Heat*, it is thus farre true; That if the *Proportion* of the *Adventine Heat*, be greatly Predominant, to the *Naturall Heat* and *Spirits* of the *Body*, it tendeth to *Dissolution*, or Notable *Alteration*. But this is wrought by *Emission*, or *Suppression*, or *Suffocation*, of the *Native Spirits*; And also by the *Disordination*, and *Discomposture* of the *Tangible Parts*; And other *Passages* of *Nature*; And not by a *Conflict* of *Heats*.

In

IN *Versions*, or *Maine Alterations* of *Bodies*, there is a *Medium* between the *Body*, as it is at first, and the *Body Resulting*; which *Medium* is *Corpus imperfectè Mistum*, and is Transitory, and not durable; As *Mists*, *Smoakes*, *Vapours*, *Chylus* in the *Stomach*, *Living Creatures* in the first *Vivification*: And the *Middle Action*, which produceth such *Imperfect Bodies*, is fitly called, (by some of the *Ancients*,) *Inquination*, or *Inconcoction*, which is a Kinde of *Putrefaction*; For the *Parts* are in *Confusion*, till they settle, one way, or other.

Experiment Solitary, touching *Bodies Vnperfectly Mixt.* 837

THe word *Concoction*, or *Digestion*, is chiefly taken into use from *Living Creatures*, and their *Organs*; And from thence extended to *Liquours*, and *Fruits*, &c. Therefore they speake of *Meat Concocted*; *Vrine* and *Excrements Concocted*; And the *Foure Digestions*, (In the *Stomach*; In the *Liver*; In the *Arteries* and *Nerves*; And in the *Severall Parts* of the *Body*;) are likewise called *Concoctions*: And they are all made to be the Workes of *Heat*: All which *Notions* are but ignorant Catches of a few Things, which are most Obvious to *Mens Observations*. The Constanteſt *Notion* of *Concoction* is, that it should signifie the *Degrees* of *Alteration*, of one *Body* into another, from *Crudity* to *Perfect Concoction*; Which is the *Vltimitie* of that *Action*, or *Processe*: And while the *Body* to be *Converted* and *Altered*, is too strong for the *Efficient*, that should *Convert*, or *Alter* it, (whereby it resisteth and holdeth fast in some degree the first *Forme*, or *Consistence*,) it is (all that while,) *Crude*, and *Inconcoct*; And the *Processe* is to be called *Crudities* and *Inconcoctions*. It is true, that *Concoction* is, in great part, the *Worke* of *Heat*; But not the *Worke* of *Heat* alone: For all Things, that further the *Conversion*, or *Alteration*, (as *Rest*, *Mixture* of a *Body* already *Concocted*, &c.) are also *Meanes* to *Concoction*. And there are of *Concoction* two *Periods*; The one *Assimilation*, or *Absolute Conversion* and *Subaction*; The other *Maturation*: whereof the Former is most conspicuous in the *Bodies* of *Living Creatures*; In which there is an *Absolute Conversion*, and *Assimilation* of the *Nourishment* into the *Body*: And likewise in the *Bodies* of *Plants*: And againe in *Metalls*, where there is a full *Transmutation*. The other, (which is *Maturation*,) is seene in *Liquours*, and *Fruits*; wherin there is not desired, nor pretended, an utter *Conversion*, but onely an *Alteration* to that *Forme*, which is most sought, for *Mans* use; As in *Clarifying* of *Drinkes*; *Ripening* of *Fruits*, &c. But note, that there bee two Kindes of *Absolute Conversions*; The one is, when a *Body* is converted into another *Body*, which was before; As when *Nourishment* is turned into *Flesh*; That is it which we call *Assimilation*. The other is, when the *Conversion* is into a *Body* meerely New, and which was not before; As if *Silver* should be turned to *Gold*; or *Iron* to *Copper*: And this *Conversion* is better called, for distinction sake, *Transmutation*.

Experiment Solitary, touching *Concoction* and *Crudity.* 838

THere are also divers other *Great Alterations* of *Matter*, and *Bodies*, besides those that tend to *Concoction*, and *Maturation*; For whatsoever doth so alter a *Body*, as it returneth not againe to that it was, may bee called *Alteratio Major*: As when *Meat* is Boyled, or Rosted, or Fried, &c. Or when *Bread* and *Meat* are Baked; Or when *Cheese* is made of Curds, or *Butter* of *Creame*, or *Coales* of wood, or *Bricks* of Earth; And a Number of others. But to apply *Notions Philosophicall* to *Plebeian Termes*; Or to say, where the *Notions* cannot fitly be reconciled, that there wanteth a *Terme*, or *Nomenclature* for it; (as the *Ancients* used;) They bee but Shifts of *Ignorance*; For

Experiment Solitary, touching *Alterations*, which may be called *Majors.* 839

Knowledge

Knowledge will bee ever a *Wandring* and *Indigested Thing*, if it bee but a *Commixture* of a few *Notions*, that are at hand and occurre, and not excited from sufficient Number of Instances, and those well collated.

The *Consistences* of *Bodies* are very Divers: *Dense*, *Rare*, *Tangible*, *Pneumaticall*; *Volatile*, *Fixed*; *Determinate*, *Not Determinate*, *Hard*, *Soft*; *Cleaving*, Not *Cleaving*; *Congeleable*, *Not Congeleable*; *Liquefiable*, Not *Liquefiable*; *Fragile*, *Tough*; *Flexible*, *Inflexible*; *Tractile*, or to be drawne forth in length, *Intractile*; *Porous*, *Solide*; *Equall*, and *Smooth*, *Unequall*; *Venous*, and *Fibrous*, and with *Graines*, *Entire*; And divers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, and *Drought* is a Compendious and Inutile *Speculation*. But of these see principally our *Abecedarium Naturæ*; And otherwise *Sparsim* in this our *Sylva Sylvarum*, Nevertheless in some good part, Wee shall handle divers of them now presently.

Experiment Solitary, touching *Bodies Liquefiable*, and *not Liquefiable*. 840

Liquefiable, and *Not Liquefiable*, proceed from these *Causes*: *Liquefaction* is ever caused by the *Detention* of the *Spirits*, which play within the *Body*, and Open it. Therefore such *Bodies*, as are more *Turgide* of *Spirit*; Or that have their *Spirits* more *Straitly Imprisoned*; Or againe that hold them *Better Pleased* and *Content*; are *Liquefiable*: for these three *Dispositions* of *Bodies*, doe arrest the *Emission* of the *Spirits*. An Example of the first two *Properties* is in *Metalls*; And of the last in *Grease*, *Pitch*, *Sulphure*, *Butter*, *Waxe*, &c. The *Disposition* not to *Liquefie* proceedeth from the *Easie Emission* of the *Spirits*, whereby the *Grosser Parts* contract; And therefore, *Bodies Iejune* of *Spirits*; Or which part with their *Spirits* more *Willingly*; are not *Liquefiable*; As *Wood*, *Clay*, *Free-Stone*, &c. But yet, even many of those *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithstanding *Soften*; As *Iron* in the Forge; And a *Sticke* bathed in Hot Ashes, which thereby becommeth more Flexible. Moreover, there are some *Bodies*, which doe *Liquefie*, or dissolve by *Fire*; As *Metalls*, *Waxe*, &c. And other *Bodies*, which dissolve in *Water*; As *Salt*, *Sugar*, &c. The *Cause* of the former proceedeth from the *Dilatation* of the *Spirits* by *Heat*: The *Cause* of the Latter proceedeth from the *Opening* of the *Tangible Parts*, which desire to receive the *Liquour*. Againe, there are some *Bodies*, that dissolve with both; As *Gumme*, &c. And those bee such *Bodies*, as on the One Side have good store of *Spirit*; And on the other Side, have the *Tangible Parts Indigent* of *Moisture*; For the former helpeth to the *Dilating* of the *Spirits* by the *Fire*; And the Latter stimulateth the Parts to Receive the *Liquor*.

Experiment Solitary, touching *Bodies Fragile*, and *Tough*. 841

Of *Bodies* some are *Fragile*; And some are *Tough*, and *Not Fragile*; And in the *Breaking*, some *Fragile Bodies* break but where the *Force* is; Some shatter and flie in many Peeces. Of *Fragility* the *Cause* is an *Impotency* to bee *Extended*: And therefore *Stone* is more *Fragile* than *Metall*; And so *Fictile Earth* is more *Fragile* than *Crude Earth*, And *Dry Wood* than *Greene*. And the *Cause* of this *Vnaptnesse* to *Extension*, is the *Small Quantity* of *Spirits*; (For it is the *Spirit* that furthereth the *Extension* or *Dilatation* of *Bodies*;) And it is ever Concomitant with *Porosity*, and with *Drinesse* in the *Tangible Parts*:

Contrariwise,

Contrariwise, *Tough Bodies* have more *Spirit*, and fewer *Pores*, and *Moister Tangible Parts*: Therefore we see that *Parchment*, or *Leather* will stretch, *Paper* will not; *Woollen Cloth* will tenter, *Linnen* scarcely.

Experiment Solitary, touching the *Two Kinds* of *Pneumaticals* in *Bodies*. 842

ALL *Solide* Bodies consist of *Parts* of two severall *Natures*; *Pneumaticall*, and *Tangible*; And it is well to be noted, that the *Pneumaticall Substance* is in some Bodies, the *Native Spirit* of the Bodie; And in some other, plaine *Aire* that is gotten in; As in Bodies *desiccate*, by *Heat*, or *Age*: For in them, when the *Native Spirit* goeth forth, and the *Moisture* with it, the *Aire* with time getteth into the *Pores*. And those Bodies are ever the more *Fragile*; For the *Native Spirit* is more *Yeelding*, and *Extensive*, (especially to follow the *Parts*,) than *Aire*. The *Native Spirits* also admit great Diversitie; As *Hot*, *Cold*, *Active*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as we call them) of *Bodies*: But the *Aire Intermixt*, is without *Vertues*, and maketh Things *Insipide*, and without any *Extimulation*.

Experiment Solitary, touching *Concretion*, and *Dissolution* of *Bodies*. 843

THe *Concretion* of *Bodies* is (commonly) solved by the *Contrary*; As *Ice*, which is congealed by *Cold*, is dissolved by *Heat*; *Salt* and *Sugar*, which are Excocted by *Heat*, are Dissolved by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations*, are rather *Returnes* to their former *Nature*, than *Alterations*: So that the *Contrary* cureth. As for *Oyle*, it doth neither easily congeale with *Cold*, nor thicken with *Heat*. The *Cause* of both *Effects*, though they be produced by Contrary *Efficients*, seemeth to be the Same; And that is, because the *Spirit* of the *Oyle*, by either Meanes, exhaleth little; For the *Cold* keepeth it in; and the *Heat*, (except it bee Vehement,) doth not call it forth. As for *Cold*, though it take hold of the *Tangible Parts*, yet as to the *Spirits*, it doth rather make them Swell, than Congeale them: As when *Ice* is congealed in a *Cup*, the *Ice* will Swell in stead of Contracting; And sometimes Rift.

Experiment Solitary, touching *Hard* and *Soft Bodies*. 844

OF *Bodies*, some (we see) are *Hard*, and some *Soft*: The *Hardnesse* is caused (chiefly) by the *Iejuneneſſe* of the *Spirits*; And their *Imparity* with the *Tangible Parts*: Both which if they be in a greater degree, maketh them not onely *Hard*, but *Fragile*, and lesse Enduring of *Pressure*; As *Steele*, *Stone*, *Glasse*, *Drie Wood*, &c. *Softnesse* commeth (contrariwise) by the Greater *Quantity* of *Spirits*; (which ever helpeth to Induce *Yeelding* and *Cession*;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*; As in *Gold*, *Lead*, *Wax*, &c. But note, that *Soft Bodies*, (as we use the word,) are of two *Kinds*; The one, that easily giveth place to another *Body*, but altereth not *Bulke*, by Rising in other *Places*: And therefore we see that *Wax*, if you put any Thing into it, doth not rise in *Bulke*, but onely giveth Place: For you may not thinke, that in *Printing* of *Wax*, the *Wax* riseth up at all; But onely the *depressed Part* giveth place, and the other remaineth as it was. The other that altereth *Bulke* in the *Cession*, As *Water*, or other *Liquours*, if you put a *Stone*, or any Thing into them, they give place (indeed) easily, but then they rise all over: Which is a False *Cession*; For it is in *Place*, and not in *Body*.

Experiment Solitary, touching *Bodies Ductile*, and *Tensile*. 845

ALL *Bodies Ductile*, and *Tensile*, (as *Metals* that will be drawne into *Wires*; *Wooll* and *Towe* that will be drawne into *Yarne*, or *Thred*; have in them the *Appetite* of *Not Discontinuing*, Strong; Which maketh them follow the Force, that pulleth them out; And yet so, as not *Discontinue* or

forsake their owne *Body*. *Viscous Bodies*, (likewise,) as *Pitch*, *Wax*, *Bird-Lime*, *Cheese toasted*, will draw forth, and roape. But the difference betweene *Bodies Fibrous*, and *Bodies Viscous*, is Plaine; For all *Wooll*, and *Tow*, and *Cotton*, and *Silke*, (especially raw *Silke*,) have, besides their desire of *Continuance*, in regard of the *Tenuitie* of their *Thred*, a *Greedinesse* of *Moisture*; And by *Moisture* to joyne and incorporate with other *Thred*; Especially if there bee a little *Wreathing*; As appeareth by the *Twisting* of *Thred*; And the Practice of *Twirling* about of *Spindles*. And we see also, that *Gold* and *Silver Thred* cannot be made without *Twisting*.

Experiment Solitary, touching other *Passions* of *Matter*, and *Characters* of *Bodies*.

846

THe *Differences* of *Impressible* and *Not Impressible*, *Figurable*, and not *Figurable*; *Mouldable*, and *Not Mouldable*; *Scissible* and *Not Scissible*; and many other *Passions* of *Matter*, are *Plebeian Notions*, applied unto the *Instruments* and *Vses* which Men ordinarily practise; But they are all but the *Effects* of some of these *Causes* following; Which we will Enumerate without Applying them, because that would bee too long. The First is the *Cession*, or *Not Cession* of *Bodies*, into a *Smaller Space* or *Roome*, keeping the Outward *Bulke*, and not flying up. The Second is the *Stronger* or *Weaker Appetite*, in *Bodies*, to *Continuitie*, and to flie *Discontinuitie*. The Third is the *Disposition* of *Bodies*, to *Contract*, or *Not Contract*; And againe, to *Extend*, or *Not Extend*. The Fourth is the *Small Quantity*, or *Great Quantity*, of the *Pneumaticall* in *Bodies*. The Fifth is the *Nature* of the *Pneumaticall*, whether it bee *Native Spirit* of the *Body*, or *Common Aire*. The Sixth is, the *Nature* of the *Native Spirits* in the *Body*, whether they be *Active* and *Eager*, or *Dull* and *Gentle*. The Seventh is the *Emission* or *Detention* of the *Spirits* in *Bodies*. The Eighth is the *Dilatation*, or *Contraction* of the *Spirits* in *Bodies*, while they are detained. The Ninth is the *Collocation* of the *Spirits* in *Bodies*; whether the *Collocation* be *Equall*, or *Vnequall*; And againe, whether the *Spirits* be *Coacervate*, or *Diffused*. The Tenth is the *Densitie*, or *Rarity* of the *Tangible Parts*. The Eleventh is the *Equalitie* or *Inequality* of the *Tangible Parts*. The Twelfth is the *Digestion*, or *Crudities* of the *Tangible Parts*. The Thirteenth is the *Nature* of the *Matter*, whether *Sulphureous*, or *Mercuriall*, *Watrie* or *Oilie*, *Drie* and *Terrestriall*, or *Moist* and *Liquid*; which *Natures* of *Sulphureous* and *Mercuriall*, seeme to be *Natures Radicall*, and *Principall*. The Fourteenth is the *Placing* of the *Tangible Parts*, in *Length* or *Transverse*; (As it is in the *Warp*, and the *Woofe*, of *Textiles*;) *More Inward*, or *More Outward*, &c. The Fifteenth is the *Porositie*, or *Imporosity* betwixt the *Tangible Parts*; And the *Greatnesse*, or *Smalnesse* of the *Pores*. The Sixteenth is the *Collocation* and *Posture* of the *Pores*. There may be more *Causes*; But these doe occure for the Present.

Experiment Solitary, touching *Induration* by *Sympathy*.

847

TAke *Lead*, and melt it, and in the Middest of it, when it beginneth to Congeale, make a little Dint, or Hole, and put *Quick-Silver* wrapped in a Peece of *Linnen* into that Hole, and the *Quick-Silver* will fix, and runne no more, and endure the Hammer. This is a Noble *Instance* of *Induration*, by *Consent* of one *Body* with another, and *Motion* of *Excitation* to *Imitate*; For to ascribe it onely to the *Vapour* of *Lead*, is lesse Probable. *Quære* whether the *Fixing* may be in such a degree, as it will be Figured like other *Metalls*? For if so, you may make Workes of it for some purposes, so they come not neare the *Fire*.

Sugar

SVgar hath put downe the use of *Honey*; Insomuch as we have lost those *Observations*, and *Preparations* of *Honey*, which the *Ancients* had, when it was more in Price. First, it seemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the *Teare* or *Bloud* issuing from the *Tree*: Insomuch as one of the *Ancients* relateth, that in *Trebisond*, there was *Honey* issuing from the *Box-Trees*, which made *Men* Mad. Againe, in Ancient time, there was a Kinde of *Honey*, which either of the owne Nature, or by Art, would grow as Hard as *Sugar*; And was not so Lushious as Ours. They had also a *Wine* of *Honey*, which they made thus. They crushed the *Honey* into a great *Quantity* of *Water*, and then strained the *Liquour*; After they boyled it in a Copper to the halfe: Then they powred it into *Earthen Vessells*, for a small time; And after turned it into *Vessels* of *Wood*, and kept it for many yeares. They have also, at this day, in *Russia*, and those *Northerne Countries*, *Mead Simple*, which (well made, and seasoned) is a good wholesome *Drinke*, and very Cleare. They use also in *Wales*, a Compound *Drinke* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that we have lost in *Honey*, there were brought in use a *Sugar-Mead*, (for so we may call it,) though without any *Mixture* at all of *Honey*; And to brew it, and keep it stale, as they use *Mead*; For certainly, though it would not be so *Absterssive*, and *Opening*, and *Solutive* a *Drinke* as *Mead*; yet it will be more gratefull to the *Stomach*, and more *Lenitive*, and fit to bee used in *Sharp Diseases*: For we see, that the use of *Sugar* in *Beere*, and *Ale*, hath good *Effects* in such Cases.

Experiment Solitary, touching *Honey* and *Sugar*. 848

IT is reported by the *Ancients*, that there was a Kinde of *Steele*, in some places, which would polish almost as white and bright as *Silver*. And that there was in *India* a Kinde of *Brasse*, which (being polished) could scarce be discerned from *Gold*. This was in the *Naturall Vre*; but I am doubtfull, whether Men have sufficiently refined *Metals*, which wee count *Base*; As whether *Iron*, *Brasse*, and *Tinne*, be refined to the Heighth? But when they come to such a Fineneſſe, as serveth the ordinary use, they trie no further.

Experiment Solitary, touching the *Finer Sort* of *Base Metals*. 849

THere have been found certaine *Cements* under *Earth*, that are very Soft; And yet, taken forth into the *Sunne*, harden as Hard as *Marble*: There are also ordinary *Quarries* in *Summerset-Shire*, which in the *Quarry* cut soft to any bigneſſe, and in the *Building* prove firme, and hard.

Experiment Solitary, touching *Cements* and *Quarries*. 850

Living Creatures (generally) doe change their *Haire* with *Age*, turning to be *Gray*, and *White*: As is seene in *Men*, though some Earlier, some Later; In *Horses*, that are Dappled, and turne *White*; In *Old Squirrels*, that turne *Grisly*; And many Others. So doe some *Birds*; As *Cygnets*, from *Gray* turne *White*; *Hawkes* from *Browne* turne more *White*: And some *Birds* there be, that upon their *Moulting*, doe turne *Colour*; As *Robin-Red-brests*, after their *Moulting* grow to be *Red* againe, by degrees; So doe *Gold-Finches* upon the *Head*. The *Cause* is, for that *Moisture* doth (chiefly) colour *Haire*, and *Feathers*; And *Drineſſe* turneth them *Gray* and *White*; Now *Haire* in *Age* waxeth *Drier*: So doe *Feathers*. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and so all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than the *Haire* of the *Head*, and doth (for the most part,) wax *Hoare* later. Out of this Ground, a *Man* may devise the *Means* of *Altering* the *Colour* of *Birds*, and the *Retardation* of *Hoare-Haires*. But of this see the fifth *Experiment*.

Experiment Solitary, touching the *Altering* of the *Colour* of *Haires* and *Feathers*. 851

Experiment Solitary, touching the *Differences* of *Living Creatures*, *Male* and *Female*. 852

THe *Difference* betweene *Male* and *Female*, in ſome *Creatures*, is not to be diſcerned, otherwiſe than in the *Parts* of *Generation:* As in *Horſes* and *Mares*, *Dogs*, and *Bitches*, *Doves He* and *Shee*, and others. But ſome differ in *Magnitude*, and that diverſly; For in moſt the *Male* is the greater; As in *Man*, *Pheaſants*, *Peacocks*, *Turkey's*; and the like: And in ſome few, as in *Hawkes*, the *Female*. Some differ in the *Haire*, and *Feathers*, both in the *Quantity*, *Criſpation*, and *Colours* of them; As *He-Lions*, are *Hirſute*, and have great *Maines*; The *She's* are ſmooth like *Cats*. *Bulls* are more *Criſpe* upon the *Fore-Head* than *Cowes*; The *Peacock*, and *Pheaſant-Cock*, and *Gold-Finch-Cock*, have glorious and fine *Colours*; The *Henn's* have not. Generally, the Hees in *Birds* have the faireſt *Feathers*. Some differ in divers *Features*; As *Bucks* have *Hornes*, *Doe's* none; *Rammes* have more *Wreathed Hornes* than *Ewes*; *Cocks* have great *Combes* and *Spurres*. *Hennes* little or none; *Boares* have great *Fangs*, *Sowes* much leſſe; The *Turky-Cocke* hath great and Swelling *Gills*, the *Henne* hath leſſe; *Men* have generally Deeper and Stronger *Voices* than *Women*. Some differ in *Faculti*e; As the *Cocks* amongſt *Singing Birds*, are the beſt *Singers*. The Chiefe *Cauſe* of all theſe, (no doubt,) is, for that the *Males* have more Strength of *Heat* than the *Females*; Which appeareth manifeſtly in this, that all young *Creatures Males*, are like *Females*; And ſo are *Eunuchs*, and *Gelt Creatures* of all kindes, liker *Females*. Now *Heat* cauſeth *Greatneſſe* of *Growth*, generally, where there is *Moiſture* enough to worke upon: But if there be found in any *Creature*, (which is ſeene rarely,) an Over-great *Heat* in proportion to the *Moiſture*, in them the *Female* is the greater; As in *Hawkes*, and *Sparrowes*. And if the *Heat* be ballanced with the *Moiſture*, then there is no *Difference* to be ſeene betweene *Male* and *Female*: As in the *Inſtances* of *Horſes*, and *Dogs*. We ſee alſo, that the *Hornes* of *Oxen*, and *Cowes*, for the moſt part, are Larger than the *Bulls*; which is cauſed by abundance of *Moiſture*, which in the *Hornes* of the *Bull* faileth. Againe, *Heat* cauſeth *Piloſitie*, and *Criſpation*; And ſo likewiſe *Beards* in *Men*. It alſo expelleth finer *Moiſture*, which want of *Heat* cannot Expell; And that is the *Cauſe* of the *Beautie* and *Varietie* of *Feathers*: Againe, *Heat* doth put forth many *Excreſcences*, and much Solide *Matter*, which Want of *Heat* cannot doe: And this is the *Cauſe* of *Hornes*, and of the *Greatneſſe* of them; And of the *Greatneſſe* of the *Combs* & *Spurres* of *Cocks*, *Gills* of *Turkey-Cocks*, and *Fangs* of *Boares*. *Heat* alſo dilateth the *Pipes*, and *Organs*, which cauſeth the *Deepneſſe* of the *Voice*. Againe, *Heat* refineth the *Spirits*, and that cauſeth the *Cock-Singing Bird*, to Excell the *Hen*.

Experiment Solitary, touching the *Comparative Magnitude* of *Living Creatures*. 853

THere be *Fiſhes* greater than any *Beaſts*; As the *Whale* is farre greater than the *Elephant*. And *Beaſts* are (generally) greater than *Birds*. For *Fiſhes*, the *Cauſe* may be, that becauſe they Live not in the *Aire*, they have not their *Moiſture* drawne and Soaked by the *Aire*, and *Sunne-Beames*. Alſo the reſt alwayes in a manner, and are ſupported by the *Water*; whereas *Motion* and *Labour* do conſume. As for the *Greatneſſe* of *Beaſts*, more than of *Birds*, it is cauſed, for that *Beaſts* ſtay Longer time in the *Womb*, than *Birds*, and there Nouriſh, and grow; Whereas in *Birds*, after the *Egge* Lay'd, there is no further *Growth*, or *Nouriſhment* from the *Female:* For the *Sitting* doth *Vivifie*, and not Nouriſh.

Experiment Solitary, touching *Exoſſation* of *Fruits*. 854

WE have partly touched before the *Meanes* of *Producing Fruits*, without *Coares*, or *Stones*. And this we adde further, that the *Cauſe* muſt be *Abundance* of *Moiſture*; For that the *Coare*, and *Stone* are made of a *Drie*

Sap: And we see, that it is possible, to make a *Tree* put forth onely in *Blossome*, without *Fruit*; As in *Cherries* with *Double Flowers*; Much more in *Fruit* without *Stone*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted upon a *Colewort-Stalke*, sendeth forth a great *Apple* without a *Coare*. It is not unlikely, that if the *Inward Pith* of a *Tree*, were taken out, so that the Juyce came onely by the *Barke*, it would worke the *Effect*. For it hath beene observed, that in *Pollards*, if the *Water* get in on the *Top*, and they become Hollow, they put forth the more. We adde also, that it is delivered for certaine by some, that if the *Cions* be grafted, the Small End downwards, it will make *Fruit* have little or no *Coares*, and *Stones*.

Experiment Solitary, touching the *Melioration* of *Tobacco*. 855

Tobacco is a thing of great Price, if it be in request. For an *Acre* of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards Charge. The Charge of making the Ground, and otherwise, is great, but nothing to the Profit. But the *English Tobacco*, hath small credit, as being too *Dull*, and *Earthy:* Nay the *Virginian Tobacco*, though that bee in a *Hotter Climate*, can get no credit, for the same *Cause*: So that a Triall to make *Tobacco* more *Aromaticall*, and better Concocted here in *England*, were a Thing of great profit. Some have gone about to doe it by Drenching the *English Tobacco*, in a *Decoction* or *Infusion* of *Indian Tobacco:* But those are but Sophistications, and Toyes; For Nothing that is once Perfect, and hath runne his Race, can receive much Amendment. You must ever resort to the Beginnings of Things for *Melioration*. The Way of *Maturation* of *Tobacco* must, as in other *Plants*, be, from the *Heat*, Either of the *Earth*, or of the *Sunne:* We see some Leading of this in Musk-Melons; which are sowen upon a *Hot Bed*, Dunged below, upon a Banke turned upon the *South Sunne*, to give *Heat* by *Reflexion*; Laid upon *Tiles*, which increaseth the *Heat*; And Covered with *Straw* to keepe them from *Cold*. They remove them also, which addeth some *Life*: And by these Helps they become as good in *England*, as in *Italy*, or *Provence*. These, and the like Meanes, may be tried in *Tobacco*. Enquire also of the *Steeping* of *Roots*, in some such *Liquour*, as may give them Vigour to put forth Strong.

Experiment Solitary, touching severall *Heate*, working the same *Effects*. 856

Heat of the *Sunne*, for the *Maturation* of *Fruits*; Yea and the *Heat* of *Vivification* of *Living Creatures*; are both represented and supplyed, by the *Heat* of *Fire*; And likewise, the *Heats* of the *Sunne*, and *Life*, are represented one by the other. *Trees*, set upon the *Backs* of *Chimneyes*, doe ripen *Fruit* sooner. *Vines*, that have beene drawne in at the Window of a *Kitchen*, have sent forth *Grapes* ripe a Moneth (at least) before others. *Stoves*, at the Backe of Walls, bring forth *Orenges* here with us. *Egges*, as is reported by some, have beene hatched in the warmth of an *Oven*. It is reported by the *Ancients*, that the *Estrich* Layeth her *Egges* under *Sand*, where the *Heat* of the *Sunne* discloseth them.

Experiment Solitary, touching *Swelling* and *Dilatation* in *Boyling*. 857

Barley in the *Boyling* swelleth not much; *Wheat* swelleth more; *Rize* extremely; In so much as a Quarter of a Pint (unboyled) will arise to a Pint boyled. The *Cause* (no doubt) is, for that the more Close and Compact the *Body* is, the more it will dilate: Now *Barley* is the most Hollow; *Wheat* more Solide than that; and *Rize* most Solide of all. It may bee also that some *Bodies* have a Kinde of *Lentour*, and more *Depertible Nature* than others; As we see it Evident in *Colouration*; For a Small *Quantity* of *Saffron*, will Tinct more, than a very great *Quantity* of *Bresill*, or *Wine*.

Experiment Solitary, touching the *Dulcoration* of *Fruits*. 858

FRuit groweth *Sweet* by *Rowling*, or *Preſſing* them gently with the *Hand*; As *Rowling Peares*, *Damaſins*, &c. By *Rottenneſſe*; As *Medlars*, *Services*, *Sloe's*, *Heps*, &c. By *Time*; As *Apples*, *Wardens*, *Pomegranats*, &c. By certaine Speciall *Maturations*; As by *Laying* them in *Hay*, *Straw*, &c. And by *Fire*; As in *Roaſting*, *Stewing*, *Baking*, &c. The *Cauſe* of the *Sweetneſſe* by *Rowling*, and *Preſſing*, is *Emollition*, which they properly enduce; As in Beating of *Stock-Fiſh*, *Fleſh*, &c. By *Rottenneſſe* is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather *Heat*, and thereby diſgeſt the Harder Part: For in all *Putrefactions*, there is a *Degree* of *Heat*. By *Time* and *Keeping* is, becauſe the *Spirits* of the *Body*, doe ever feed upon the *Tangible Parts*, and attenuate them. By Severall *Maturations* is, by ſome *Degree* of *Heat*. And by *Fire* is, becauſe it is the Proper Worke of *Heat* to Refine, and to Incorporate; And all *Soureneſſe* conſiſteth in ſome *Groſſeneſſe* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which ever induceth a Milder *Taſte*.

Experiment Solitary, touching *Fleſh Edible*, and not *Edible*. 859

OF *Fleſhes*, ſome are *Edible*; Some, except it bee in *Famine*, not. For thoſe that are not *Edible*, the *Cauſe* is, for that they have (commonly) too much *Bitterneſſe* of *Taſte*; And therefore thoſe *Creatures*, which are Fierce and Cholerick, are not *Edible*; As *Lions*, *Wolves*, *Squirrels*, *Dogs*, *Foxes*, *Horſes*, &c. As for *Kine*, *Sheepe*, *Goats*, *Deere*, *Swine*, *Conneyes*, *Hares*, &c. We ſee they are *Milde*, and *Fearfull*. Yet it is true, that *Horſes*, which are *Beaſts* of Courage, have beene, and are eaten by ſome *Nations*; As the *Scythians* were called *Hippophagi*; And the *Chineſes* eat *Horſe-fleſh* at this day; And ſome *Gluttons* have uſed to have *Colts-fleſh* baked. In *Birds*, ſuch as are *Carnivoræ*, and *Birds* of *Prey*, are commonly no Good *Meat*; But the Reaſon is, rather the *Cholerick Nature* of thoſe *Birds*, than their *Feeding* upon *Fleſh*; For *Puits*, *Gulls*, *Shovelers*, *Ducks*, doe feed upon *Fleſh*, and yet are good *Meat*: And wee ſee, that thoſe *Birds*, which are of *Prey*, or feed upon *Fleſh*, are good *Meat*, when they are very Young; As *Hawkes*, *Rookes* out of the Neſt, *Owles*, &c. *Mans Fleſh* is not Eaten. The Reaſons are Three: Firſt, becauſe *Men* in *Humanity* doe abhorre it: Secondly, becauſe no *Living Creature*, that *Dyeth* of *it ſelfe*, is good to Eat: And therefore the *Canibalis* (themſelves) eat no *Mans-Fleſh*, of thoſe that *Die* of *Themſelves*, but of ſuch as are *Slaine*. The Third is, becauſe there muſt be (generally) ſome *Diſparity*, betweene the *Nouriſhment*, and the *Body Nouriſhed*; And they muſt not be Over-neare, or like: yet we ſee, that in great *Weakneſſes*, and *Conſumptions*, *Men* have beene ſuſtained with *Womans Milke*: And *Ficinus* fondly (as I conceive) adviſeth, for the *Prolongation* of *Life*, that a *Veine* bee opened in the *Arme* of ſome wholeſome *Young Man*; And the *Bloud* to be ſucked. It is ſaid, that *Witches* doe greedily eat *Mans Fleſh*; which if it be true, beſides a *Devilliſh Appetite* in them, it is likely to proceed, for that *Mans fleſh* may ſend up High and Pleaſing *Vapours*, which may ſtirre the *Imagination*; And *Witches* Felicitie is chiefly in *Imagination*, as hath beene ſaid.

Experiment Solitary, touching the *Salamander*. 860

THere is an Ancient Received *Tradition* of the *Salamander*, that it liveth in the *Fire*, and hath force alſo to extinguiſh the *Fire*. It muſt have two Things, if it be true, to this *Operation*: The One a very *Cloſe Skin*, whereby *Flame*, which in the Midſt is not ſo hot, cannot enter: For wee ſee that if the *Palme* of the *Hand* bee annointed thicke with *White* of *Egge*, and

then

then *Aquavitæ* bee poured upon it, and *Enflamed*, yet one may endure the *Flame* a pretty while. The other is some *Extreme Cold* and *Quenching vertue*, in the *Body* of that *Creature*, which choaketh the *Fire*. Wee see that *Milke* quencheth *Wilde-Fire*, better than *Water*, because it entreth better.

Experiment Solitary, touching the *Contrary Operations* of *Time*, upon *Fruits*, and *Liquours*. 861

Time doth change *Fruit*, (as *Apples*, *Peares*, *Pomegranats*, &c.) from more *Soure*, to more *Sweet*: But contrariwise *Liquours* (even those that are of the *Iuyce* of *Fruit*,) from more *Sweet* to more *Soure*; As *Wort*, *Must*, *New Verjuyce*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both Kindes, the *Spirit* is attenuated by *Time*; But in the first Kinde, it is more *Diffused*, and more mastered by the *Grosser Parts*, which the *Spirits* doe but disgest: But in *Drinkes* the *Spirits* doe reigne, and finding lesse Opposition of the *Parts*, become themselves more *Strong*; Which causeth also more Strength in the *Liquour*; Such, as if the *Spirits* be of the Hotter Sort, the *Liquour* becommeth apt to *Burne*; But in Time, it causeth likewise, when the Higher *Spirits* are Evapourated, more *Soureness*.

Experiment Solitary, touching *Blowes* and *Bruises*. 862

IT hath beene observed by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applied presently to a *Blow*, will keepe it downe from *Swelling*. The *Cause* is *Repercussion*, without *Humectation*, or *Entrance* of any *Body*: for the *Plate* hath onely a *Virtuall Cold*, which doth not search into the *Hurt*; Whereas all *Plasters* and *Oyniments* doe enter. Surely, the *Cause*, that *Blowes* and *Bruises* induce *Swellings*, is, for that the *Spirits* resorting to Succour the *Part* that Laboureth, draw also the *Humours* with them: For we see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Strucken*, that causeth it; For that *Gouts*, and *Tooth-Aches* cause *Swelling*, where there is no *Percussion* at all.

Experiment Solitary, touching the *Orris Root*. 863

THe *Nature* of the *Orris Root*, is almost Singular; For there be few *Odoriferous Roots*; And in those that are, in any degree, *Sweet*, it is but the same *Sweetnesse* with the *Wood*, or *Leafe*: but the *Orris* is not *Sweet* in the *Leafe*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to have a Tender dainty *Heat*; which when it commeth above Ground, to the *Sunne*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a Smell like a *Violet*.

Experiment Solitary, touching the *Compression* of *Liquours*. 864

IT hath beene observed by the *Ancients*, that a great *Vessell* full, drawne into *Bottles*; And then the *Liquour* put againe into the *Vessell*, will not fill the *Vessell* again, so full as it was, but that it may take in more *Liquour*: And that this holdeth more in *Wine*, than in *Water*. The *Cause* may bee Triviall; Namely, by the *Expence* of the *Liquour*, in regard some may sticke to the Sides of the *Bottles*: But there may bee a *Cause* more Subtill; Which is, that the *Liquour* in the *Vessell*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessell*, the *Liquour* meeteth with *Liquour* chiefly; But in the *Bottles* a Small Quantity of *Liquour*, meeteth with the Sides of the *Bottles*, which Compresse it so, that it doth not Open againe.

Experiment Solitary, touching the *Working* of *Water* upon *Aire Contiguous*. 865

Water, being contiguous with *Aire*, Cooleth it, but Moisteneth it not, except it *Vapour*. The *Cause* is, for that *Heat* and *Cold* have a *Virtuall Transition*, without *Communication* of *Substance*; but *Moisture* not: And to all *Madefaction* there is required an *Imbibition*: But where the *Bodies* are of such severall Levitie, and Gravity, as they Mingle not, they can follow no

no *Imbibition*. And therefore, *Oyle* likewiſe lyeth at the *Top* of the *Water*, without Commixture: And a *Drop* of *Water*, running ſwiftly over a *Straw*, or *Smooth Body*, wetteth not.

Experiment Solitary, touching the *Nature* of *Aire*.

866 *Starre-Light Nights*, yea and bright *Moone-ſhine Nights*, are *Colder* than *Cloudy Nights*. The *Cauſe* is, the *Drineſſe* and *Fineneſſe* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharpe*: And therefore *Great Continents* are colder than *Iſlands*: And as for the *Moone*, though it ſelfe inclineth the *Aire* to *Moiſture*, yet when it ſhineth bright, it argueth the *Aire* is drie. Alſo *Cloſe Aire* is warmer than *Open Aire*; which (it may bee) is, for that the true *Cauſe* of *Cold*, is an *Expiration* from the *Globe* of the *Earth*, which in open *Places* is ſtronger; And againe, *Aire* it ſelfe, if it be not altered by that *Expiration*, is not without ſome Secret *Degree* of *Heat*: As it is not likewiſe without ſome Secret *Degree* of *Light*: For otherwiſe *Cats*, and *Owles*, could not ſee in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Viſuall Spirits* of thoſe *Creatures*.

Experiments in Conſort, touching the *Eyes*, and *Sight*.

867 THe *Eyes* doe move one and the ſame way; For when one *Eye* moveth to the *Noſthrill*, the other moveth from the *Noſthrill*. The *Cauſe* is *Motion* of *Conſent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Vſe* will induce the Contrary: For ſome can *Squint*, when they will: And the Common *Tradition* is, that if *Children*, be ſet upon a Table, with a Candle behinde them, both *Eyes* will move Outwards; As affecting to ſee the *Light*, and ſo induce *Squinting*.

868 We ſee more exquiſitely with *One Eye Shut*, than with *Both Open*. The *Cauſe* is, for that the *Spirits Viſuall* unite themſelves more, and ſo become Stronger. For you may ſee, by looking in a *Glaſſe*, that when you ſhut one *Eye*, the *Pupill* of the other *Eye*, that is Open, Dilateth.

869 The *Eyes*, if the *Sight* meet not in one *Angle*, *See Things Double*. The *Cauſe* is, for that *Seeing* two Things, and *Seeing* one Thing twice, worketh the ſame *Effect*: And therefore a little *Pellet*, held betweene two *Fingers*, laid a croſſe, ſeemeth *Double*.

870 *Pore-Blinde Men*, ſee beſt in the *Dimmer Light*; And likewiſe have their *Sight* Stronger neere hand, than thoſe that are not *Pore-blinde*; And can Reade and Write ſmaller *Letters*. The *Cauſe* is, for that the *Spirits Viſuall*, in thoſe that are *Pore-blinde*, are Thinner, and Rarer, than in others; And therefore the Greater *Light* diſperſeth them. For the ſame *Cauſe* they need Contracting; But being *Contracted*, are more ſtrong, than the *Viſuall Spirits* of Ordinary *Eyes* are; As when we ſee thorow a *Levell*, the *Sight* is the Stronger: And ſo is it, when you gather the *Eye-lids* ſomewhat cloſe: And it is commonly ſeene in thoſe that are *Pore-blinde*, that they doe much gather the *Eye-lids* together. But *Old Men*, when they would ſee to Read, put the Paper ſomewhat a farre off. The *Cauſe* is, for that *Old Mens Spirits Viſuall*, contrary to thoſe of *Pore-blinde Men*, unite not, but when the *Object* is at ſome good diſtance, from their *Eyes*.

871 *Men* ſee better, when their *Eyes* are over-againſt the *Sunne*, or a *Candle*, if they put their *Hand* a little before their *Eye*. The Reaſon is, for that the *Glaring* of the *Sunne*, or the *Candle*, doth weaken the *Eye*; whereas the *Light Circumfuſed* is enough for the *Perception*. For we ſee, that an *Over-light* maketh the *Eyes* Dazell; Inſomuch as Perpetuall Looking againſt the *Sunne*, would Cauſe *Blindneſſe*. Againe, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwiſe, if they come out of a *Darke Roome*, into a

Light

Light Roome, they seeme to have a *Mist* before their *Eyes*, and see worse than they shall doe, after they have stayed a little while, either in the *Light*, or in the *Darke*. The *Cause* is, for that the *Spirits Visuall*, are upon a sudden Change, disturbed, and put out of Order; And till they be recollected, doe not performe their Function well. For when they are much *Dilated* by *Light*, they cannot *Contract* suddenly; And when they are much *Contracted* by *Darkenesse*, they cannot *Dilate* suddenly. And Excesse of both these, (that is, of the *Dilatation*, and *Contraction* of the *Spirits Visuall*,) if it be long, Destroyeth the *Eye*. For as long looking against the *Sunne*, or *Fire* hurteth the *Eye* by *Dilatation*; So *Curious Painting* in *Small Volumes*, and *Reading* of *Small Letters*, doe hurt the *Eye* by *Contraction*.

872 It hath beene observed, that in *Anger*, the *Eyes* wax *Red*; And in *Blushing*, not the *Eyes*, but the *Eares*, and the *Parts* behinde them. The *Cause* is, for that in *Anger*, the *Spirits* ascend and wax Eager; Which is most easily seen in the *Eyes*, because they are Translucide; Though withall it maketh both the *Cheekes* and the *Gills Red*; But in *Blushing*, it is true, the *Spirits* ascend likewise to Succour, both the *Eyes*, and the *Face*, which are the *Parts* that labour: But then they are repulsed by the *Eyes*, for that the *Eyes*, in Shame doe put back the *Spirits*, that ascend to them, as unwilling to looke abroad: For no *Man*, in that *Passion*, doth looke strongly, but Dejectedly; And that *Repulsion* from the *Eyes*, Diverteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them.

873 The *Objects* of the *Sight*, may cause a great *Pleasure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*; Except it be by *Memory*, as hath been said. The *Glimpses* and *Beames* of *Diamonds* that strike the *Eye*; *Indian Feathers*, that have glorious Colours; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furnished; A *Beautifull* Person; And the like; doe delight and exhilarate the *Spirits* much. The *Reason*, why it holdeth not in the *Offence*, is, for that the *Sight* is most *Spirituall* of the *Senses*; whereby it hath no *Object* Grosse enough to offend it. But the *Cause* (chiefly) is, for that there bee no *Active Objects* to offend the *Eye*. For *Harmonicall Sounds*, and *Discordant Sounds*, are both *Active*, and *Positive*: So are *Sweet Smells*, and *Stinks*: So are *Bitter*, and *Sweet*, in *Tastes*: So are *Over-Hot*, and *Over-Cold*, in *Touch*: But *Blackenesse*, and *Darkenesse*, are indeed but *Privatives*; And therefore have little or no *Activity*. Somewhat they doe Contristate, but very little.

Experiment Solitary, touching the *Colour* of the *Sea*, or other *water*.

874 WAter of the *Sea*, or otherwise, looketh *Blacker* when it is moved, and *Whiter* when it resteth. The *Cause* is, for that by means of the *Motion*, the *Beames* of light passe not Straight, and therfore must be darkened; whereas, when it resteth, the *Beames* doe passe Straight. Besides, *Splendour* hath a *Degree* of *Whitenesse*; Especially if there be a little *Repercussion*: For a *Looking-Glasse* with the *Steele* behinde, looketh *Whiter*, than *Glasse Simple*. This *Experiment* deserveth to be driven further, in Trying by what Meanes *Motion* may hinder *Sight*.

Experiment Solitary, touching *Shell-Fish*.

875 *Shell-Fish* have beene, by some of the *Ancients*, compared and sorted with the *Insecta*; But I see no reason why they should; For they have *Male*, and *Female*, as other *Fish* have: Neither are they bred of *Putrefaction*; Especially such as doe Move. Nevertheless it is certaine, that *Oysters*, and *Cockles*, and *Mussles*, which Move not, have not discriminate *Sex*. *Quære* in what time, and how they are bred? It seemeth that *Shells* of *Oysters* are bred where none

none were before; And it is tried, that the great *Horse-Muſle*, with the fine ſhell, that breedeth in *Ponds*, hath bred within thirty yeares: But then, which is ſtrange, it hath beene tried, that they doe not onely Gape and Shut, as the *Oiſters* doe, but Remove from one Place to Another.

Experiment Solitary, touching the *Right Side*, and the *Left*. 876

THe *Senſes* are alike Strong, both on the *Right Side*, and on the *Left*; But the *Limmes* on the *Right Side* are Stronger. The *Cauſe* may be, for that the *Braine* which is the *Inſtrument* of *Senſe*, is alike on both *Sides*; But *Motion*, and *Habilities* of *Moving*, are ſomewhat holpen from the *Liver*, which lieth on the *Right Side*. It may bee alſo, for that the *Senſes* are put in *Exerciſe*, indifferently, on both *Sides* from the Time of our Birth; But the *Limmes* are uſed moſt on the *Right Side*, whereby *Cuſtome* helpeth; For wee ſee, that ſome are *Left Handed*: Which are ſuch as have uſed the *Left-Hand* moſt.

Experiment Solitary, touching *Frictions*. 877

Frictions make the *Parts* more *Fleſhie*, and *Full*: As we ſee both in *Men*; And in the *Currying* of *Horſes*, &c. The *Cauſe* is, for that they draw greater *Quantitie* of *Spirits* and *Bloud* to the *Parts*: And again, becauſe they draw the *Aliment* more forcibly from within: And againe, becauſe they relax the *Pores*, and ſo make better *Paſſage* for the *Spirits*, *Bloud*, and *Aliment*: Laſtly, becauſe they diſſipate, and diſgeſt any *Inutile* or *Excrementitious Moiſture*, which lieth in the *Fleſh*: All which help *Aſſimulation*. *Frictions* alſo doe more *Fill*, and *Impinguate* the *Body*, than *Exerciſe*. The *Cauſe* is, for that in *Frictions*, the *Inward Parts* are at reſt; Which in *Exerciſe* are beaten (many times) too much: And for the ſame Reaſon, (as we have noted heretofore,) *Gally-Slaves* are *Fat* and *Fleſhie*, becauſe they ſtirre the *Limmes* more, and the *Inward Parts* leſſe.

Experiment Solitary, touching *Globes* appearing *Flat* at *Diſtance*. 878

ALL *Globes* a farre off appeare *Flat*. The *Cauſe* is, for that *Diſtance*, being a *Secundary Object of Sight*, is not otherwiſe diſcerned, than by more or leſſe *Light*; which *Diſparity* when it cannot bee diſcerned, all ſeemeth *One*: As it is (generally) in *Objects* not diſtinctly diſcerned; For ſo *Letters*, if they be ſo farre off, as they cannot be diſcerned, ſhew but as a *Duskiſh Paper*: And all *Engravings*, and *Emboſſings*, (a farre off) appear *Plaine*.

Experiment Solitary, touching *Shadowes*. 879

THe *Vttermoſt Parts* of *Shadowes* ſeeme ever to *Tremble*. The *Cauſe* is, for that the little *Moats*, which we ſee in the *Sunne*, doe ever Stirre, though there be no *Wind*; And therefore thoſe Moving, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe ſhew the *Shadow* to Move, becauſe the *Medium* Moveth.

Experiment Solitary, touching the *Rowling* and *Breaking* of the *Seas*. 880

Shallow, and *Narrow Seas*, breake more than *Deepe*, and *Large*. The *Cauſe* is, for that the *Impulſion* being the ſame in Both; Where there is greater *Quantity* of *Water*, and likewiſe *Space* Enough; there the *Water* Rowleth, and Moveth, both more Slowly, and with a Sloper Riſe, and Fall: But where there is leſſe *Water*, and leſſe *Space*, and the *Water* daſheth more againſt the bottome; there it moveth more Swiftly, and more in *Precipice*; For in the *Breaking* of the *Waves* there is ever a *Precipice*.

Experiment Solitary, touching the *Dulcoration* of *Salt-water*. 881

IT hath beene obſerved by the *Ancients*, that *Salt-Water Boyled*, or *Boyled* and *Cooled* againe, is more *Potable*, than of it ſelfe *Raw*: And yet the *Taſte* of *Salt*, in *Diſtillations* by *Fire*, riſeth not; For the *Diſtilled Water* will bee

Freſh.

Fresh. The *Cause* may be, for that the *Salt Part* of the *Water*, doth partly rise into a *Kinde* of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottome*: And so is rather a *Separation*, than an *Evaporation*. But it is too grosse to rise into a *Vapour*: And so is a *Bitter Taste* likewise; For Simple *Distilled Waters*, of *Wormewood*, and the like, are not Bitter.

IT hath beene set downe before, that *Pits* upon the *Sea-Shoare*, turne into *Fresh Water*, by *Percolation* of the *Salt* through the *Sand*: But it is further noted, by some of the *Ancients*, that in some Places of *Affricke*, after a time, the *Water* in such *Pits* will become *Brackish* againe. The *Cause* is, for that after a time, the very *Sands*, thorow which the *Salt-Water* passeth, become *Salt*; And so the *Strainir* it selfe is tincted with *Salt*. The Remedie therefore is, to digge still *New Pits*, when the old wax *Brackish*; as if you would change your *Strainer*.

Experiment Solitary, touching the *Returne* of *Saltnesse* in *Pits* upon the *Sea-Shore* 882

IT hath beene observed by the *Ancients*, that *Salt-Water*, will dissolve *Salt* put into it, in lesse time, than *Fresh Water* will dissolve it. The *Cause* may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude* of *Substance*, draw the *Salt* new put in, unto it; Whereby it diffuseth in the *Liquour* more speedily. This is a Noble *Experiment*, if it be true; For it sheweth Meanes of more Quicke and Easie *Infusions*; And it is likewise a good *Instance* of *Attraction*, by *Similitude* of *Substance*. Trie it with *Sugar* put into *Water*, formerly *Sugred*; And into other *Water Vnsugred*.

Experiment Solitary, touching *Attraction* by *Similitude* of *Substance*. 883

PUt *Sugar* into *Wine*, part of it above, part under the *Wine*; And you shall finde, (that which may seeme strange,) that the *Sugar* above the *Wine*, will soften and dissolve sooner, than that within the *Wine*. The *Cause* is, for that the *Wine* entreth that *Part* of the *Sugar*, which is under the *Wine*, by Simple *Infusion*, or *Spreading*; But that *Part* above the *Wine*, is likewise forced by *Sucking*: For all *Spungie Bodies* expell the *Aire*, and draw in *Liquour*, if it be Contiguous: As we see it also in *Spunges*, put part above the *Water*. It is worthy the Inquiry, to see how you may make more *Accurate Infusions*, by Help of *Attraction*.

Experiment Solitary, touching *Attraction*. 884

Water in *Wells* is *warmer* in *Winter*, than in *Summer*: And so *Aire* in *Caves*. The *Cause* is, for that in the Higher *Parts*, under the *Earth*, there is a *Degree* of some *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which shut close in, (as in *Winter*,) is the More; But if it Perspire, (as it doth in *Summer*,) it is the lesse.

Experiment Solitary, touching *Heat* under *Earth*. 885

IT is reported, that amongst the *Leucadians*, in *Ancient* time, upon a Superstition they did use to Precipitate a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with Strings, at some distance, many great *Fowles*; And fixing unto his *Body* divers *Feathers*, spred, to breake the *Fall*. Certainly many *Birds* of good *Wing*, (As *Kites*, and the like,) would beare up a good *Weight*, as they flie; And *Spreading* of *Feathers* thinne, and close, and in great Breadth, will likewise beare up a great *Weight*; Being even laid, without Tilting upon the Sides. The further *Extension* of this *Experiment* for *Flying* may be thought upon.

Experiment Solitary, touching *Flying* in the *Aire*. 886

THere is, in some Places, (namely in *Cephalonia*,) a little *Shrub*, which they call *Holy-Oake*, or *Dwarf-Oake*: Upon the *Leaves* whereof there riseth

Experiment Solitary, touching the *Dye* of *Scarlet*. 887

seth a *Tumour*, like a *Blister*; Which they gather, and rub out of it, a certaine *Red Dust*, that converteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they begin to Quicken: With this *Dust* they die *Scarlet*.

Experiment Solitary, touching *Maleficiating*. 888

IN *Zant*, it is very ordinary, to make *Men Impotent*, to accompany with their *Wives*. The like is Practised in *Gasconie*; Where it is called *Nouer l'eguillette*. It is practised alwayes upon the *Wedding Day*. And in *Zant*, the Mothers themselves doe it, by way of Prevention; Because thereby they hinder other *Charmes*, and can undoe their Owne. It is a Thing the *Civill Law* taketh knowledge of; And therefore is of no Light Regard.

Experiment Solitary, touching the *Rise* of *Water* by *Meanes* of *Flame*. 889

IT is a Common *Experiment*, but the *Cause* is mistaken. Take a *Pot*, (Or better a *Glasse*, because therein you may see the *Motion*,) And set a *Candle* lighted in the *Bottome* of a *Bason* of *Water*; And turne the *Mouth* of the *Pot*, or *Glasse*, over the *Candle*, and it will make the *Water* rise. They ascribe it to the *Drawing* of *Heat*; Which is not true: For it appeareth plainly to bee but a *Motion* of *Nexe*, which they call *Ne detur vacuum*; And it proceedeth thus. The *Flame* of the *Candle*, as soone as it is covered, being suffocated by the *Close Aire*, lesseneth by little and little: During which time, there is some little Ascent of *Water*, but not much: For the *Flame* Occupying lesse and lesse Roome, as it lesseneth, the *Water* succeedeth. But upon the *Instant* of the *Candles Going out*, there is a sudden *Rise*, of a great deale of *Water*; For that the *Body* of the *Flame* filleth no more Place; And so the *Aire*, and the *Water* succeed. It worketh the same *Effect*, if in stead of *Water*, you put *Flower*, or *Sand*, into the *Bason*: Which sheweth, that it is not the *Flames* Drawing the *Liquour*, as *Nourishment*; As it is supposed; For all *Bodies* are alike unto it; As it is ever in *Motion* of *Nexe*; Insomuch as I have seen the *Glasse*, being held by the Hand, hath lifted up the *Bason*, and all: The *Motion* of *Nexe* did so Clasp the *Bottome* of the *Bason*. That *Experiment*, when the *Bason* was lifted up, was made with *Oyle*, and not with *Water*: Nevertheless this is true, that at the very first *Setting* of the *Mouth* of the *Glasse*, upon the *Bottome* of the *Bason*, it draweth up the *Water* a little, and then standeth at a Stay, almost till the *Candles Going out*, as was said. This may shew some *Attraction* at first: But of this we will speake more, when we handle *Attractions* by *Heat*.

Experiments in Consort, touching the *Influences* of the *Moone*.

Of the *Power* of the *Celestiall Bodies*, and what more Secret *Influences* they have, besides the two Manifest *Influences* of *Heat*, and *Light*, Wee shall speake, when wee handle *Experiments* touching the *Celestiall Bodies*: Meane-while, wee will give some Directions for more certaine *Trialls*, of the *Vertue* and *Influences* of the *Moone*; which is our *Neerest Neighbour*.

The *Influences* of the *Moone*, (most observed,) are Foure, The *Drawing forth* of *Heat*: The *Inducing* of *Putrefaction*: the *Increase* of *Moisture*: The *Exciting* of the *Motions* of *Spirits*.

For

890 For the *Drawing forth* of *Heat*, we have formerly prescribed to take *Water Warme*, and to set Part of it against the *Moone Beames*, and Part of it with a *Skreene* betweene; And to see whether that which standeth Exposed to the *Beames*, will not *Coole* sooner. But because this is but a Small *Interposition*, (though in the *Sunne* we see a Small *Shade* doth much,) it were good to trie it, when the *Moone* shineth, and when the *Moone* shineth not at all; And with *Water Warme* in a *Glasse-Bottle*, as well as in a *Dish*; And with *Cinders*; And with *Iron Red-Hot*; &c.

891 For the *Inducing* of *Putrefaction*, it were good to trie it with *Flesh*, or *Fish*, Exposed to the *Moone-Beames*; And againe Exposed to the *Aire*, when the *Moone* shineth not, for the like time; To see whether will corrupt sooner: And trie it also with *Capon*, or some other *Fowle*, laid abroad, to see whether it will mortifie, and become tender sooner? Trie it also with Dead *Flies*, or Dead *Wormes*, having a little *Water* cast upon them, to see whether will *Putrefie* sooner. Trie it also with an *Apple*, or *Orenge*, having *Holes* made in their *Tops*, to see whether will Rot or Mould sooner? Trie it also with *Holland Cheese*, having *Wine* put into it; whether will breed *Mites* sooner or greater?

892 For the *Increase* of *Moisture*, the Opinion Received is; That *Seeds* will grow soonest; And *Haire*, and *Nailes*, and *Hedges*, and *Herbs*, Cut, &c. will grow soonest, if they be Set, or Cut, in the *Increase* of the *Moone*. Also that *Braines* in *Rabits*, *Wood-Cocks*, *Calves*, &c. are fullest in the *Full* of the *Moone*: And so of *Marrow* in the *Bones*; And so of *Oysters*, and *Cockles*, which of all the rest are the easiest tried, if you have them in *Pits*.

893 Take some *Seeds*, or *Roots*, (as *Onions*, &c.) And set some of them immediately after the *Change*; And others of the same kinde immediately after the *Full*: Let them be as Like as can be: The *Earth* also the Same as neare as may be; And therefore best in *Pots*: Let the *Pots* also stand, where no *Raine*, or *Sunne* may come to them, lest the *Difference* of the *Weather* confound the *Experiment*: And then see in what Time, the *Seeds Set* in the *Increase* of the *Moone*, come to a certaine Height; And how they differ from those that are *Set* in the *Decrease* of the *Moone*.

894 It is like, that the *Braine* of *Man* waxeth *Moister*, and *Fuller*, upon the *Full* of the *Moone*: And therefore it were good for those that have *Moist Braines*, and are great *Drinkers*, to take *Fume* of *Lignum Aloës*, *Rose-Mary*, *Frankincense*, &c. about the *Full* of the *Moone*. It is like also, that the *Humours* in *Mens Bodies*, Increase, and Decrease, as the *Moone* doth; And therefore it were good to Purge, some day, or two, after the *Full*; For that then the *Humours* will not repleniish so soone againe.

895 As for the *Exciting* of the *Motion* of the *Spirits*, you must note that the *Growth* of *Hedges*, *Herbs*, *Haire*, &c. is caused from the *Moone*, by *Exciting* of the *Spirits*, as well as by *Increase* of the *Moisture*. But for *Spirits* in particular, the great *Instance* is in *Lunacies*.

896 There may be other Secret *Effects* of the *Influence* of the *Moone*, which are not yet brought into *Observation*. It may be, that if it so fall out, that the *Wind* be *North*, or *North-East*, in the *Full* of the *Moone*, it increaseth *Cold*; And if *South*, or *South-West*, it disposeth the *Aire*, for a good while, to *Warmth*, and *Raine*; Which would be observed.

897 It may be, that *Children*, and *Young Cattell*, that are *Brought forth* in the *Full* of the *Moone*, are stronger, and larger, than those that are brought forth in the *Wane*: And those also which are *Begotten* in the *Full* of the *Moone*: So that it might be good *Husbandrie*, to put *Rammes*, and *Bulls* to their

Females, somewhat before the *Full* of the *Moone*. It may bee also, that the *Egges* lay'd in the *Full* of the *Moone*, breed the better *Bird:* And a Number of the like *Effects*, which may bee brought into *Observation: Quære* also, whether great *Thunders*, and *Earth-Quakes*, be not most in the *Full* of the *Moone*.

Experiment Solitary, touching *Vinegar* 898

THe *Turning* of *Wine* to *Vinegar*, is a Kind of *Putrefaction:* And in *Making* of *Vinegar*, they use to set *Vessels* of *Wine* over against the *Noone-Sunne*; which calleth out the more *Oylie Spirits*, and leaveth the *Liquour* more *Soure*, and *Hard*. We see also, that *Burnt-Wine* is more *Hard*, and *Astringent*, than *Wine Vnburnt*. It is said that *Cider* in *Navigations* under the *Line* ripeneth, when *VVine* or *Beere* sowreth. It were good to set a *Rundlet* of *Verjuyce* over against the *Sunne*, in *Summer*, as they doe *Vinegar*, to see whether it will Ripen, and Sweeten.

Experiment Solitary, touching *Creatures* that *Sleep* all *Winter*. 899

THere be divers *Creatures*, that *Sleepe* all *VVinter*; As the *Beare*, the *Hedge-hog*, the *Bat*, the *Bee*, &c. These all wax *Fat* when they *Sleepe*, and egest not. The *Cause* of their *Fattening*, during their *Sleeping time*, may be the *VVant* of *Assimilating*; For whatsoever *Assimilateth* not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping-Time*, have beene observed not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remove*. And they get *VVarme* and *Close Places* to *Sleep* in. When the *Flemmings* Wintred in *Nova Zembla*, the *Beares*, about the Middle of *November*, went to *Sleepe*, And then the *Foxes* began to come forth, which durst not before. It is noted by some of the *Ancients*, that the *Shee-Beare* breedeth, and lyeth in with her Young, during that time of *Rest:* And that a *Beare*, *Big* with *Young*, hath seldome beene seene.

Experiment Solitary, touching the *Generation* of *Creatures* by *Copulating*, and by *Putrefaction*. 900

SOme *Living Creatures* are Procreated by *Copulation* betweene *Male*, and *Female:* Some by *Putrefaction*; And of those which come by *Putrefaction*, many doe (nevertheless) afterwards procreate by *Copulation*. For the *Cause* of both *Generations:* First, it is most certaine, that the *Cause* of all *Vivification*, is a *Gentle* and *Proportionable Heat*, working upon a *Glutinous* and *Yeelding Substance:* For the *Heat* doth bring forth *Spirit* in that *Substance:* And the *Substance*, being *Glutinous*, produceth Two *Effects:* The One, that the *Spirit* is *Detained*, and cannot *Breake forth:* The Other, that the *Matter* being *Gentle*, and *Yeelding*, is driven forwards by the *Motion* of the *Spirits*, after some *Swelling* into *Shape*, and *Members*. Therefore all *Sperme*, all *Menstruous Substance*, all *Matter* whereof *Creatures* are produced by *Putrefaction*, have evermore a *Closeness*, *Lentour*, and *Sequacitie*. It seemeth therefore, that the *Generation* by *Sperme onely*, and by *Putrefaction*, have two Different *Causes*. The first is, for that *Creatures*, which have a *Definite* and *Exact Shape*, (as those have which are Procreated by *Copulation*,) cannot be produced by a *VVeake*, and *Casuall Heat*; Nor out of *Matter*, which is not *Exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required, for *Maturation* of *Perfect Creatures*; For if the *Time* required in *Vivification* bee of any length, then the *Spirit* will Exhale, before the *Creature* be *Mature:* Except it bee inclosed in a *Place* where it may have *Continuance* of the *Heat*, *Accesse* of some *Nourishment* to maintaine it, and *Closeness* that may keepe it from *Exhaling*. And such

Places

Places, or the *VVombs*, and *Matrices*, of the *Females*. And therefore all *Creatures*, made of *Putrefaction*, are of more *Vncertaine Shape*; And are made in *Shorter Time*; And need not so Perfect an *Enclosure*, though some *Closeneſſe* be commonly required. As for the *Heathen Opinion*, which was, that upon great *Mutations* of the *VVorld*, *Perfect Creatures* were first Engendred of *Concretion*; As well as *Frogs*, and *VVormes*, and *Flies*, and such like, are now; Wee know it to bee vaine: But if any such Thing should bee admitted, Diſcourſing according to *Senſe*, it cannot be, except you admit of a *Chaos* first, and *Commixture* of *Heaven* and *Earth*.

For the *Frame* of the *VVorld* once in Order, cannot effect it by any *Exceſſe*, or *Caſualty*.

NATU-

NATVRALL HISTORIE.

X. Century.

THe *Philosophie* of *Pythagoras*, (which was full of *Superstition*,) did first plant a *Monstrous Imagination*, which afterwards was, by the *Schoole* of *Plato*, and Others, Watted, and Nourished. It was, That the *World* was *One*, *Entire*, *Perfect*, *Living Creature*; Insomuch as *Apollonius* of *Tyana*, a *Pythagorean Prophet*, affirmed, that the *Ebbing* and *Flowing* of the *Sea*, was the *Respiration* of the *World*, drawing in *Water* as *Breath*, and putting it forth againe. They went on, and inferred; That if the *World* were a *Living Creature*, it had a *Soule*, and *Spirit*; Which also they held, calling it *Spiritus Mundi*; The *Spirit* or *Soule* of the *World*: By which they did not intend *God*; (for they did admit of a *Deity* besides:) But onely the *Soule*, or *Essentiall Forme* of the *Vniverse*. This *Foundation* being laid, they mought build upon it, what they would; For in a *Living Creature*, though never so great, (As for Example, in a great *Whale*,) the *Sense*, and the *Affects* of any one *Part* of the *Body*, instantly make a *Transcursion* thorow-out the whole *Body*: So that by this they did insinuate, that no distance of *Place*, nor *Want* or *Indisposition* of *Matter*, could hinder *Magicall Operations*; But that (for Example,) we mought here in *Europe*, have *Sense* and *Feeling* of that, which was done

Experiments in Consort, touching the *Transmission*, and *Influx*, of *Immateriate Vertues*, and the *Force* of *Imagination*.

in *China*: And likewise, we mought worke any *Effect*, *without* and *against Matter*: And this, not Holpen by the *Cooperation* of *Angels*, or *Spirits*, but onely by the *Vnitie* and *Harmony* of *Nature*. There were some also, that staid not here; but went further, and held; That if the *Spirit* of *Man*, (whom they call the *Microcosme*,) doe give a fit touch to the *Spirit* of the *World*, by strong *Imaginations*, and *Beleefes*, it might command *Nature*; For *Paracelsus* and some darksome *Authors*, of *Magicke*, doe ascribe to *Imagination Exalted*, the *Power* of *Miracle-working Faith*. With these Vast and Bottomelesse *Follies*, *Men* have beene (in part) entertained.

But wee, that hold firme to the *Works* of *God*; And to the *Sense*, which is *Gods Lamp*; (*Lucerna Dei Spiraculum Hominis*;) will enquire, with all Sobrietie, and Severity, whether there be to be found, in the Foot-steps of *Nature*, any such *Transmission* and *Influx* of *Immateriate Vertues*; And what the *Force* of *Imagination* is; Either upon the *Body Imaginant*, or upon another *Body*: Wherein it will be like that *Labour* of *Hercules*, in Purging the *Stable* of *Augeas*, to separate from *Superstitious*, and *Magicall Arts*, and *Observations*, any thing that is cleane, and pure *Naturall*; And not to be either Contemned, or Condemned. And although we shall have occasion to speake of this in more Places than One, yet we will now make some Entrance thereinto.

Experiments in Consort, *Monitorie*, touching *Transmission* of *Spirits*, and the *Force* of *Imagination*.

901

Men are to be Admonished, that they doe not with-draw Credit, from the *Operations* by *Transmission* of *Spirits*, and *Force* of *Imagination*, because the *Effects faile sometimes*. For as in *Infection*, and *Contagion* from *Body* to *Body*, (as the *Plague*, and the like,) it is most certaine, that the *Infection* is received (many times) by the *Body Passive*, but yet is by the *Strength*, and good *Disposition* thereof, Repulsed, and wrought out, before it be formed in a *Disease*; So much more in *Impressions* from *Minde* to *Minde*, or from *Spirit* to *Spirit*, the *Impression* taketh, but is Encountred, and Overcome, by the *Minde* and *Spirit*, which is *Passive*, before it worke any manifest *Effect*. And therefore they worke most upon *Weake Mindes*, and *Spirits*: As those of *Women*; *Sicke Persons*; *Superstitious* and *Fearfull Persons*; *Children*, and *Young Creatures*:

Nescio quis teneros Oculus mihi fascinat Agnos:

The *Poet* speaketh not of *Sheep*, but of *Lambs*. As for the *Weakenesse* of the *Power* of them, upon *Kings*, and *Magistrates*; It may bee ascribed (besides the main, which is the *Protection* of *God*, over those that Execute his Place,) to the *Weakenesse* of the *Imagination* of the *Imaginant*: For it is hard for a *Witch*, or a *Sorcerer*, to put on a Beliefe, that they can hurt such *Persons*.

902

Men are to be Admonished, on the other side, that they doe not easily give Place and Credit to these *Operations*, because they *Succeed many times*;

For

For the *Cauſe* of this *Succeſſe*, is (oft) to be truely aſcribed, unto the *Force* of *Affection* and *Imagination*, upon the *Body Agent*; And then by a *Secondary Meanes*, it may worke upon a *Divers Body*: As for Example; If a *Man* carry a *Planets Seale*, or a *Ring*, or ſome *Part* of a *Beaſt*, beleeving ſtrongly, that it will help him to obtaine his *Love*; Or to keep him from danger of hurt in *Fight*; or to prevaile in a *Suit*; &c. it may make him more *Active*, and *Induſtrious*; And againe, more *Confident*, and *Perſiſting*, than otherwiſe he would be. Now the great *Effects* that may come of *Induſtrie*, and *Perſeverance*, (eſpecially in *Civill Buſineſſe*,) who knoweth not? For wee ſee *Audacity* doth almoſt binde and mate the *weaker Sort* of *Mindes*; And the *State* of *Humane Actions* is ſo variable, that to trie Things oft, and never to give over, doth Wonders: Therefore it were a Meere *Fallacie* and *Miſtaking*, to aſcribe that to the *Force* of *Imagination*, upon another *Body*, which is but the *Force* of *Imagination* upon the Proper *Body*: For there is no doubt, but that *Imagination*, and *Vehement Affection*, worke greatly upon the *Body* of the *Imaginant*: As we ſhall ſhew in due place.

Men are to be Admoniſhed, that as they are not to miſtake the *Cauſes* of theſe *Operations*; So, much leſſe, they are to miſtake the *Fact*, or *Effect*; And raſhly to take that for done, which is not done. And therefore, as divers wiſe *Iudges* have preſcribed, and cautioned, *Men* may not too raſhly beleeve, the *Confeſſions* of *Witches*, nor yet the *Evidence* againſt them. For the *Witches* themſelves are *Imaginative*, and beleeve oft-times, they doe that, which they doe not: And *People* are *Credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-Craft*. It is worthy the Obſerving, that both in *Ancient*, and *Late times*; (As in the *Theſſalian witches*, and the Meetings of *Witches* that have beene recorded by ſo many late *Confeſſions*;) the great *Wonders* which they tell, of *Carrying* in the *Aire*; *Transforming* themſelves into other *Bodies*; &c. are ſtill reported to bee wrought, not by *Incantations* or *Ceremonies*; But by *Ointments*, and *Annointing* themſelves all over: This may juſtly move a *Man* to thinke, that theſe *Fables* are the *Effects* of *Imagination*: For it is certaine, that *Ointments* doe all, (if they be laid on any thing thicke,) by *Stopping* of the *Pores*, ſhut in the *Vapours*, and ſend them to the *Head* extremely. And for the Particular *Ingredients* of thoſe *Magicall Ointments*, it is like they are *Opiate*, and *Soporiferous*. For *Annointing* of the *Fore-head*, *Necke*, *Feet*, *Back-Bone*, wee know is uſed for Procuring *Dead Sleeps*: And if any *Man* ſay, that this *Effect* would bee better done by Inward *Potions*; Anſwer may bee made, that the *Medicines*, which goe to the *Ointments*, are ſo ſtrong, that if they were uſed inwards, they would kill thoſe that uſe them: And therefore they work Potently, though Outwards.

903

We will divide the Severall Kindes of the *Operations*, by *Tranſmiſſion* of *Spirits*, and *Imagination*; Which will give no ſmall Light to the *Experiments* that follow. All *Operations* by *Tranſmiſſion* of *Spirits*, and *Imagination* have this; That they *Work* at *Diſtance*, and not at *Touch*; And they are theſe being diſtinguiſhed.

The Firſt is the *Tranſmiſſion* or *Emiſſion*, of the *Thinner*, and more *Aire Parts* of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the reſt, the moſt *Corporeall*. But you muſt remember withall, that there be a Number of thoſe *Emiſſions*, both *Wholeſome*, and *Vnwholeſome*, that give no *Smell* at all:

904

For

For the *Plague*, many times when it is taken, giveth no *Sent* at all: And there be many *Good* and *Healthfull Aires*, that doe appeare by *Habitation*, and other Proofes, that differ not in *Smell* from other *Aires*. And under this Head, you may place all *Imbibitions* of *Aire*, where the *Substance* is *Materiall*, *Odour-like*; Whereof some nevertheleſſe are ſtrange, and very ſuddenly diffuſed; As the *Alteration* which the *Aire* receiveth in *Ægypt*, almoſt immediately, upon the *Riſing* of the *River* of *Nilus*, whereof we have ſpoken.

905 The Second is the *Tranſmiſſion* or *Emiſſion* of thoſe *Things* that wee call *Spirituall Species*; As *Viſibles*, and *Sounds*: The one whereof wee have handled; And the other wee ſhall handle in due place. Theſe move ſwiftly, and at great diſtance; But then they require a *Medium* well diſpoſed; And their *Tranſmiſſion* is eaſily ſtopped.

906 The Third is the *Emiſſions*, which cauſe *Attraction* of *Certaine Bodies* at *Diſtance*; Wherein though the *Loadſtone* be commonly placed in the Firſt Ranke, yet we thinke good to except it, and referre it to another *Head*: but the *Drawing* of *Amber*, and *Iet*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Silver*, at diſtance; And the *Attraction* of *Heat* at diſtance; And that of *Fire* to *Naphtha*: And that of ſome *Herbs* to *VVater*, though at diſtance; And divers others; Wee ſhall handle, but yet not under this preſent *Title*, but under the *Title* of *Attraction* in generall.

907 The Fourth is the *Emiſſion* of *Spirits*, and *Immateriate Powers* and *Vertues*, in thoſe Things, which worke by the *Vniverſall Configuration*, and *Sympathy* of the *VVorld*; Not by *Formes*, or *Celeſtiall Influxes*, (as is vainly taught and received,) but by the *Primitive Nature* of *Matter*, and the *Seeds* of *Things*. Of this kinde is, (as we yet ſuppoſe,) the *VVorking* of the *Load-Stone*, which is by *Conſent* with the *Globe* of the *Earth*: Of this kinde is the *Motion* of *Gravitie*, which is by *Conſent* of *Denſe Bodies*, with the *Globe* of the *Earth*: Of this kinde is ſome *Diſpoſition* of *Bodies* to *Rotation*, and particularly from *Eaſt* to *VVeſt*: Of which kinde we conceive the *Maine Float* and *Refloat* of the *Sea* is, which is by *Conſent* of the *Vniverſe*, as Part of the *Diurnall Motion*. Theſe *Immateriate Vertues* have this Propertie differing from others; That the *Diverſity* of the *Medium* hindereth them not; But they paſſe through all *Mediums*; yet at *Determinate Diſtances*. And of theſe wee ſhall ſpeake, as they are incident to ſeverall *Titles*.

908 The Fifth is the *Emiſſions* of *Spirits*; And this is the Principall in our Intention to handle now in this Place: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, upon other *Spirits*: And this is of a *Double Nature*: The *Operations* of the *Affections*, if they be Vehement; And the *Operation* of the *Imagination*, if it be Strong. But theſe two are ſo *Coupled*, as we ſhall handle them together; For when an *Envious*, or *Amorous Aſpect*, doth infect the *Spirits* of Another, there is Joyned both *Affection*, and *Imagination*.

909 The Sixth is, the Influxes of the *Heavenly Bodies*, beſides thoſe two Manifeſt Ones, of *Heat*, and *Light*. But theſe we will handle, where we handle the *Celeſtiall Bodies*, and *Motions*.

910 The Seventh is the *Operations* of *Sympathy*; Which the *Writers* of *Naturall Magicke* have brought into an *Art*, or *Precept*: And it is this; That if you deſire to Super-induce, any *Vertue* or *Diſpoſition*, upon a *Perſon*, you ſhould take the *Living Creature*, in which that *Vertue* is moſt *Eminent*, and in *Perfection*: Of that *Creature* you muſt take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Againe, you muſt take thoſe *Parts*, in the *Time*, and *Act*, when that *Vertue* is moſt in *Exerciſe*; And then you muſt apply it to that

Part

Part of *Man*, wherein that *Vertue* chiefly *Consisteth*. As if you would Superinduce *Courage* and *Fortitude*, take a *Lion*, or a *Cocke*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cocke*: Take those *Parts* immediately after the *Lion*, or the *Cocke* have beene in *Fight*; And let them be worne, upon a *Mans-Heart*, or *Wrest*. Of these and such like *Sympathies*, we shall speake under this present *Title*.

The Eighth and last is, an *Emission* of *Immateriate Vertues*; Such as wee are a little doubtfull to Propound; It is so prodigious: But that it is so constantly avouched by many: And we have set it downe, as a Law to our Selves, to examine things to the Bottome; And not to receive upon Credit, or reject upon Improbabilities, untill there hath passed a due Examination. This is, the *Sympathy* of *Individuals*: For as there is a *Sympathy* of *Species*; So, (it may be) there is a *Sympathy* of *Individuals*: That is, that in *Things*, or the *Parts* of *Things* that have beene once *Contiguous*, or *Entire*, there should remain a *Transmission* of *Vertue* from the One to the Other: As betweene the *Weapon*, and the *Wound*. Whereupon is blazed abroad the *Operation* of *Vnguentum Veli*: And so of a *Peece* of *Lard*, or *Sticke* of *Elder*, &c. that if *Part* of it be Consumed or Putrified, it will worke upon the other *Part Severed*. Now we will pursue the *Instances* themselves. 911

THe *Plague* is many times taken without *Manifest Sense*, as hath beene said. And they report, that where it is found, it hath a Sent, of the *Smell* of a *Mellow Apple*; And (as some say) of *May Flowers*: And it is also received, that *Smels* of *Flowers* that are *Mellow* and *Lushious*, are ill for the *Plague*; As *White-Lillies*, *Cowslips*, and *Hyacinths*. Experiments in Consort touching *Emission* of *Spirits* in *Vapour*, or *Exhalation*, *Odour-like*.

The *Plague* is not easily received by such, as continually are about them, that have the *Plague*; As *Keepers* of the *Sicke*, and *Physitians*; Nor againe by such as take *Antidotes*, either Inward, (as *Mithridate*; *Iuniper-Berries*; *Rue*, *Leafe*, and *Seed*; &c.) Or Outward, (as *Angelica*, *Zedoary*, and the like, in the Mouth; *Tarre*, *Galbanum*, and the like, in Perfume;) Nor againe by *Old People*, and such as are of a *Drie* and *Cold Complexion*. On the other side, the *Plague* taketh soonest hold of those, that come out of a *Fresh Aire*; And of those that are *Fasting*; And of *Children*; And it is likewise noted to goe in a *Bloud*, more than to a *Stranger*. 912 913

The most Pernicious *Infection*, next the *Plague*, is the *Smell* of the *Iayle*, When *Prisoners* have beene Long, and Close, and Nastily kept; Whereof we have had, in our time, Experience, twice or thrice; when both the *Iudges* that sate upon the *Iayle*, and *Numbers* of those that attended the Businesse, or were present, *Sickned* upon it, and *died*. Therefore it were good wisdome, that in such Cases, the *Iayle* were Aired, before they be brought forth. 914

Out of question, if such *Foule Smells* bee made by *Art*, and by the Hand, they consist chiefly of *Mans Flesh*, or *Sweat*, *Putrified*; For they are not those *Stinks*, which the *Nosthrils* straight abhorre, and expell, that are most *Pernicious*; But such *Aires*, as have some similitude with *Mans Body*; And so insinuate themselves, and betray the *Spirits*. There may bee great danger, in using such Compositions, in great Meetings of People, within Houses; As in *Churches*; At *Arraignments*; At *Playes* and *Solemnities*; And the like; For *Poysoning* of *Aire* is no lesse dangerous than *Poysoning* of *Water*; Which hath been used by the *Turks* in the Warres; And was used by *Emanuel Comnenus* towards the *Christians*, when they passed thorow his *Country* to the *Holy Land*. And these *Empoysonments* of *Aire*, are the more dangerous in *Meetings* of *People*; Because the much *Breath* of *People*, doth further the *Reception* of 915

the

the *Infection*: And therefore, where any such thing is feared, it were good, those *Publique Places* were perfumed, before the *Assemblies*.

916 The *Empoysonment* of Particular *Persons*, by *Odours*, hath beene reported to be in *Perfumed Gloves*, or the like: And it is like, they Mingle the *Poyson* that is deadly, with some *Smells* that are Sweet, which also maketh it the sooner received. *Plagues* also have been raised by *Annointings* of the *Chincks* of *Doores*, and the like; Not so much by the Touch, as for that it is common for *Men*, when they finde any thing Wet upon their Fingers, to put them to their *Nose*; Which Men therefore should take heed how they doe. The best is, that these *Compositions* of *Infectious Aires*, cannot be made without *Danger* of *Death*, to them that make them. But then againe, they may have some *Antidotes* to save themselves; So that *Men* ought not to be secure of it.

917 There have beene, in divers *Countries*, great *Plagues*, by the *Putrefaction*, of great *Swarmes* of *Grasse-Hoppers*, and *Locusts*, when they have beene dead, and cast upon Heaps.

918 It happeneth oft in *Mines*, that there are *Damps*, which kill, either by *Suffocation*, or by the *Poysonous Nature* of the *Minerall*: And those that deale much in *Refining*, or other Workes about *Metals*, and *Mineralls*, have their *Braines* Hurt and Stupefied by the *Metalline Vapours*. Amongst which, it is noted, that the *Spirits* of *Quick-Silver*, ever flie to the *Skull*, *Teeth*, or *Bones*; Insomuch as *Gilders* use to have a Peece of *Gold* in their *Mouth*, to draw the *Spirits* of the *Quick-Silver*; Which *Gold* afterwards they finde to be Whitened. There are also certaine *Lakes*, and *Pits*, such as that of *Avernus*, that *Poyson Birds*, (as is said,) which fly over them; Or *Men*, that stay too long about them.

919 The *Vapour* of *Char-Coale*, or *Sea-Coale*, in a Close Roome, hath killed many: And it is the more dangerous, because it commeth without any *Ill Smell*; But stealeth on by little and little; Enducing onely a *Faintnesse*, without any *Manifest Strangling*. When the *Dutch-Men* Wintred at *Nova Zembla*, and that they could gather no more Sticks, they fell to make Fire of some *Sea-Coale* they had, wherewith (at first) they were much refreshed; But a little after they had sit about the *Fire*, there grew a Generall Silence, and lothnesse to speake amongst them; And immediately after, One of the *Weakest* of the *Company*, fell down in a Swoune; Whereupon they doubting what it was, opened their doore, to let in *Aire*, and so saved themselves. The *Effect* (no doubt) is wrought by the *Instissation* of the *Aire*; And so of the *Breath*, and *Spirits*. The like ensueth in *Roomes* newly *Plaistered*, if a *Fire* bee made in them; Whereof no lesse *Man* than the *Emperour Iovinianus* Died.

920 *Vide* the *Experiment*, 803. touching the *Infectious Nature* of the *Aire*, upon the First *Showers*, after long *Drought*.

921 It hath come to passe, that some *Apothecaries*, upon *Stamping* of *Coloquintida*, have beene put into a great *Skouring*, by the *Vapour* onely.

922 It hath beene a Practice, to burne a *Pepper*, they call *Ginny-Pepper*; Which hath such a strong *Spirit*, that it provoketh a *Continuall Sneezing*, in those that are in the *Roome*.

923 It is an *Ancient Tradition*, that *Bleare-Eyes* infect *Sound Eyes*; And that a *Menstruous Woman*, looking upon a *Glasse*, doth rust it. Nay they have an *Opinion*, which seemeth *Fabulous*; That *Menstruous Women*, going over a *Field*, or *Garden*, doe *Corne* and *Herbs* good by *Killing* the *Wormes*.

924 The *Tradition* is no lesse *Ancient*, that the *Basiliske* killeth by *Aspect*; And that

that the *Wolfe*, if he see a *Man* first, by *Aspect* striketh a *Man* hoarse.

Perfumes Convenient doe drie and strengthen the *Brain*; And stay *Rheumes*, and *Defluxions*; As we finde in *Fume* of *Rose-Mary* dried, and *Lignum Aloës*, and *Calamus* taken at the *Mouth*, and *Nosthrils*; And no doubt there be other *Perfumes*, that doe moisten, and refresh; And are fit to be used in *Burning Agues*, *Consumptions*, and too much *Wakefulnesse*; Such as are, *Rose-Water*, *Vinegar*, *Limon-Pills*, *Violets*, the *Leaves* of *Vines* sprinkled with a little *Rose-Water*, &c. 925

They doe use in *Sudden Faintings*, and *Swounings*, to put a *Handkerchiefe* with *Rose-Water*, or a *Little Vinegar*, to the *Nose*; Which gathereth together againe the *Spirits*, which are upon point to resolve, and fall away. 926

Tobacco comforteth the *Spirits*, and dischargeth *Wearinesse*; Which it worketh, partly by Opening; But chiefly by the *Opiate Vertue*, which condenseth the *Spirits*. It were good therefore to trie the *Taking* of *Fumes* by *Pipes*, (as they doe in *Tobacco*,) of other *Things*; As well to drie, and comfort, as for other *Intentions*. I wish Triall bee made of the *Drying Fume*, of *Rose-Mary*, and *Lignum-Aloës*, before mentioned, in *Pipe*; And so of *Nutmeg*, and *Folium Indum*; &c. 927

The *Following* of the *Plough*, hath beene approved, for *Refreshing* the *Spirits*, and *Procuring Appetite*: But to doe it in the *Ploughing* for *Wheat*, or *Rye*, is not so good; Because the *Earth* hath spent her Sweet *Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it when you sow *Barley*. But because Ploughing is tied to *Seasons*, it is best to take the *Aire* of the *Earth*, new turned up, by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may doe themselves much good by kneeling upon a Cushion, and *Weeding*. And these Things you may practise in the best *Seasons*; Which is ever the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweetest Earth* you can chuse. It would be done also, when the *Dew* is a little off the *Ground*, lest the *Vapour* bee too Moist. I knew a great *Man*, that lived Long, who had a Clean *Clod* of *Earth*, brought to him every *Morning*, as hee sate in his *Bed*; And he would hold his *Head* over it, a good pretty while. I commend also, sometimes, in *Digging* of *New Earth*, to poure in some *Malmesey*, or *Greeke Wine*; That the *Vapour* of the *Earth*, and *Wine* together, may comfort the *Spirits*, the more; Provided alwayes, it be not taken, for a *Heathen Sacrifice*, or *Libation* to the *Earth*. 928

They have, in *Physicke*, Use of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Provoking* of *Sleepe*, &c. For though those things be not so strong as *Perfumes*, yet you may have them continually in your *Hand*; whereas *Perfumes* you can take but at *Times*; And besides, there be divers *Things*, that breath better of themselves, than when they come to the *Fire*; As *Nigella Romana*; the *Seed* of *Melanthium*, *Amomum*; &c. 929

There be two *Things*, which (inwardly used) doe Coole and condense the *Spirits*; And I wish the same to be tried outwardly in *Vapours*. The One is *Nitre*, which I would have dissolved in *Malmesey*, or *Greeke-Wine*, and so the *Smell* of the *Wine* taken; Or if you would have it more forcible, poure of it upon a *Fire-pan*, well heated, as they doe *Rose-water* and *Vinegar*. The Other is the *Distilled Water* of *Wilde Poppey*; which I wish to bee mingled, at halfe, with *Rose-Water*, and so taken with some *Mixture* of a few *Cloves*, in a *Perfuming-Pan*. The like would be done with the *Distilled Water* of *Saffron Flowers*. 930

Smells

931 *Smells* of *Muske*, and *Amber*, and *Civit*, are thought to further *Venereous Appetite*: Which they may doe by the *Refreshing* and *calling forth* of the *Spirits*.

932 *Incense*, and *Nidorous Smells*, (such as were of *Sacrifices*,) were thought to Intoxicate the *Braine*, and to dispose *Men* to *Devotion*: Which they may doe by a kinde of *Sadnesse*, and *Contristation* of the *Spirits*: And partly also by *Heating*, and *Exalting* them. We see, that amongst the *Iewes*, the *Principall Perfume* of the *Sanctuary*, was forbidden all *Common Vses*.

933 There be some *Perfumes*, prescribed by the *Writers* of *Naturall Magicke*, which procure *Pleasant Dreames*; And some others, (as they say,) that procure *Propheticall Dreames*; As the *Seeds* of *Flax*, *Flea-Wort*, &c.

934 It is certaine, that *Odours* doe, in a small Degree, Nourish; Especially the *Odour* of *Wine*: And wee see *Men* an hungred, doe love to smell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *Woman*, in the House, complaine, that shee should bee kept from being at a *Feast*, and *Solemnity*, (which she much desired to see,) because there would be a *Corps* in the House; Whereupon he caused *Loaves* of *New Bread* to bee sent for, and opened them; And powred a little *Wine* into them; And so kept himselfe alive with the *Odour* of them, till the *Feast* was past. I knew a *Gentleman*, that would fast (sometimes) three or foure, yea five dayes, without *Meat*, *Bread*, or *Drinke*; But the same *Man* used to have continually, a great *Wisp* of *Herbs*, that hee smelled on: And amongst those *Herbs*, some *Esculent Herbs* of strong *Sent*; As *Onions*, *Garlick*, *Leekes*, and the like.

935 They doe use, for the *Accident* of the *Mother*, to burne *Feathers*, and other *Things* of *Ill Odour*: And by those *Ill Smells*, the *Rising* of the *Mother* is put downe.

936 There be *Aires*, which the *Physitians* advise their *Patients* to remove unto, in *Consumptions*, or upon *Recovery* of *Long Sicknesses*: Which (commonly are *Plaine Champaignes*, but *Grasing*, and not Over-growne with *Heath*, or the like: Or else *Timber-Shades*, as in *Forrests*, and the like. It is noted also, that *Groves* of *Bayes* doe forbid *Pestilent Aires*; Which was accounted a great *Cause* of the Wholesome *Aire* of *Antiochia*. There be also some *Soyles* that put forth *Odorate Herbs* of themselves; As *Wilde Thyme*; *Wilde Marjoram*; *Penny-Royall*; *Camomill*; And in which the *Briar-Roses* smell almost like *Muske-Roses*; Which (no doubt) are *Signes* that doe discover an *Excellent Aire*.

937 It were good for *Men*, to thinke of having *Healthfull Aire*, in their *Houses*; Which will never be, if the *Roomes* be *Low-Roofed*, or full of *Windowes*, and *Doores*; For the one maketh the *Aire Close*, and not *Fresh*; And the other maketh it Exceeding *Vnequall*; Which is a great Enemy to *Health*. The *Windowes* also should not be high up to the *Roofe*, (which is in use for Beautie, and Magnificence,) but Low. Also *Stone-VValls* are not wholesome; But *Timber* is more wholesome; And especially *Brick*, Nay it hath beene used by some, with great Successe, to make their *VValls* thick; And to put a Lay of *Chalke* betweene the *Bricks*, to take away all *Dampishnesse*.

Experiment Solitary, touching the *Emissions* of *Spirituall Species* which *Affect* the *Senses*.

938 THese *Emissions* (as we said before,) are handled, and ought to be handled, by themselves, under their *Proper Titles*: That is, *Visibles*, and *Audibles*, each a-part: In this Place, it shall suffice to give some generall *Observations*, Common to both. First, they seeme to bee *Incorporeall*. Secondly, they Worke *Swiftly*. Thirdly, they Worke at *Large Distances*. Fourthly, in *Curious Varieties*. Fiftly, they are not *Effective* of any *Thing*; Nor leave no

Worke behinde them; But are *Energies* meerely; For their *Working* upon *Mirrours*, and *Places* of *Eccho*, doth not alter any Thing in those *Bodies*; But it is the same *Action* with the *Originall*, onely *Repercussed*. And as for the *Shaking* of *Windowes*, or *Rarifying* the *Aire* by *Great Noises*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seeme to be of so *Tender*, and *Weake* a *Nature*, as they affect onely such a Rare, and Attenuate *Substance*, as is the *Spirit* of *Living Creatures*.

Experiments in Consort, touching the *Emission* or *Immateriate Vertues* from the *Mindes*, and *Spirits* of *Men*, either by *Affections*, or by *Imaginations*, or by other *Impressions*.

IT is mentioned in some *Stories*, that where *Children* have beene *Exposed*, or taken away young from their *Parents*; And that afterward they have approached to their *Parents* presence, the *Parents*, (though they have not knowne them,) have had a *Secret Ioy*, or Other *Alteration* thereupon. 939

There was an *Ægyptian South-Sayer*, that made *Anthonius* beleeve, that his *Genius*, (which otherwise was *Brave*, and *Confident*,) was, in the Presence of *Octavianus Cæsar*, *Poore*, and *Cowardly*: And therefore, he advised him, to absent himselfe, (as much as he could,) and remove farre from him. The *South-Sayer* was thought to be suborned by *Cleopatra*, to make him live in *Ægypt*, and other Remote *Places* from *Rome*. Howsoever the Conceit of a *Predominant* or *Mastering Spirit* of one *Man* over Another, is Ancient, and Received still, even in *Vulgar Opinion*. 940

There are Conceits, that some *Men*, that are of an *Ill*, and *Melancholy Nature*, doe incline the *Company*, into which they come, to be *Sad*, and *Ill disposed*; And contrariwise, that Others, that are of a *Iouiall Nature*, doe dispose the *Company to be Merry* and *Cheerfull*. And againe, that some *Men* are *Luckie* to bee *kept Company* with, and *Employed*; And others *Vnluckie*. Certainly, it is agreeable to *Reason*, that there are, at the least, some *Light Effluxions* from *Spirit* to *Spirit*, when *Men* are in *Presence* one with another, as well as from *Body* to *Body*. 941

It hath beene observed, that *Old Men*, who have loved *Young Company*, and beene Conversant continually with them, have beene of *Long Life*; Their *Spirits*, (as it seemeth,) being Recreated by such *Company*. Such were the *Ancient Sophists*, and *Rhetoricians*; Which ever had *Young Auditours*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who lived till they were an Hundred yeares Old. And so likewise did many of the *Grammarians*, and *Schoole-Masters*; such as was *Orbilius*, &c. 942

Audacitie and *Confidence* doth, in Civill Busines, so great Effects, as a *Man* may (reasonably) doubt, that besides the very *Daring*, and *Earnestnesse*, and *Persisting*, and *Importunitie*, there should be some *Secret Binding*, and *Stooping* of other *Mens Spirits*, to such *Persons*. 943

The *Affections* (no doubt) doe make the *Spirits* more *Powerfull*, and *Active*; And especially those *Affections*, which draw the *Spirits* into the *Eyes*: Which are two: *Love*, and *Envy*, which is called *Oculus Malus*. As for *Love*, the *Platonists*, (some of them,) goe so farre, as to hold that the *Spirit* of the *Lover*, doth passe into the *Spirits* of the *Person Loved*; Which causeth the desire of Returne into the *Body*, whence it was *Emitted*: Whereupon followeth that *Appetite* of *Contract*, and *Conjunction*, which is in *Lovers*. And this is observed likewise, that the *Aspects* that procure *Love*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Envy*, that emitteth some *Maligne* and *Poysonous Spirits*, which taketh hold of the *Spirit* of Another; And is likewise of greatest Force, when the *Cast* of the *Eye* is *Oblique*. It hath beene noted also, that it is most Dangerous, when an 944

Envious Eye is caſt upon *Perſons* in *Glory*, and *Triumph*, and *Joy*. The *Reaſon* whereof is, for that, at ſuch times, the *Spirits* come forth moſt, into the *Outward Parts*, and ſo meet the *Percuſſion* of the *Envious Eye*, more at *Hand*: And therefore it hath beene noted, that after great *Triumphs*, *Men* have been ill diſpoſed, for ſome Dayes following. We ſee the Opinion of *Faſcination* is Ancient; for both *Effects*; Of Procuring *Love*; And *Sickneſſe* cauſed by *Envie*: And *Faſcination* is ever by the *Eye*. But yet if there be any ſuch *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Preſence*, and not by the *Eye* alone; Yet moſt Forcibly by the *Eye*.

945 *Feare*, and *Shame*, are likewiſe *Infective*; For we ſee that the *Starting* of one will make another ready to *Start*: And when one *Man* is out of *Countenance* in a *Company*, others doe likewiſe *Bluſh* in his behalfe.

Now we will ſpeake of the *Force* of *Imagination* upon other *Bodies*; and of the *Meanes* to *Exalt* and *Strengthen* it. *Imagination*, in this Place, I underſtand to bee, the *Repreſentation* of an *Individuall Thought*. *Imagination* is of three Kindes: The Firſt *Joyned* with *Beleefe* of that which is to *Come*: The Second *Joyned* with *Memorie* of that which is *Paſt*; And the Third is of *Things Preſent*, or as if they were *Preſent*; For I comprehend in this, *Imagination Faigned*, and at *Pleaſure*; As if one ſhould *Imagine* ſuch a *Man* to bee in the *Veſtments* of a *Pope*; Or to have *Wings*. I ſingle out, for this time, that which is with *Faith*, or *Beleefe* of that which is to *Come*. The *Inquiſition* of this *Subject*, in our way, (which is by *Induction*,) is wonderfull hard; For the *Things* that are reported, are full of *Fables*; And *New Experiments* can hardly bee made, but with Extreme Caution; For the Reaſon which wee will after declare.

The *Power* of *Imagination* is in three Kindes; The Firſt, upon the *Body* of the *Imaginant*; Including likewiſe the *Child* in the *Mothers Womb*; The Second is, the *Power* of it upon *Dead Bodies*, as *Plants*, *Wood*, *Stone*, *Metall*, &c. The Third is, the *Power* of it, upon the *Spirits* of *Men*, and *Living Creatures*; And with this laſt we will onely meddle.

The *Probleme* therefore is, whether a *Man Conſtantly* and *Strongly Beleeving*, that ſuch a *Thing* ſhall be; (As that ſuch an *One* will *Love Him*; Or that ſuch an *One* will *Grant Him* his *Requeſt*; Or that ſuch an *One* ſhall *Recover* a *Sickneſſe*; Or the like;) It doth help any thing to the *Effecting* of the *Thing* it ſelfe. And here againe we muſt warily diſtinguiſh; For it is not meant, (as hath beene partly ſaid before,) that it ſhould help by *Making* a *Man More Stout*, or more *Induſtrious*; (in which kinde a *Conſtant Beleefe* doth much;) But meerely by a *Secret Operation*,

ration, or *Binding*, or *Changing* the *Spirit* of *Another*: And in this it is hard (as wee began to say,) to make any *New Experiment*; For I cannot *command* my Selfe to *Beleeve* what I will, and so no *Triall* can be made. Nay it is worse; For whatsoever a *Man Imagineth doubtingly*, or with *Feare*, must needs doe hurt, if *Imagination* have any *Power* at all; For a *Man* representeth that oftner, that he feareth, than the contrary.

The Helpe therefore is, for a *Man* to worke by *Another*, in whom he may Create *Beleefe*, and not by *Himselfe*; untill *Himselfe* have found by *Experience*, that *Imagination* doth prevaile; For then *Experience* worketh in *Himselfe Beleefe*; if the *Beleefe*, that such a *Thing* shall be, be joyned with a *Beleefe*, that his *Imagination* may procure it.

946 For Example, I related one time to a *Man*, that was Curious, and Vaine enough in these Things; *That I saw a kinde of* Jugler, *that had a* Paire *of* Cards, *and would tell a* Man *what* Card *he thought*. This Pretended Learned Man told mee; It was a Mistaking in Mee; *For* (*said he*) *it was not the* Knowledge *of the* Mans Thought, *for that is Proper to* God,) *but it was the* Inforcing *of a* Thought *upon him, and* Binding *his* Imagination *by a* Stronger, *that hee could* Think no other *Card*. And thereupon he asked mee a *Question*, or two, which I thought, he did but cunningly, knowing before what used to be the *Feats* of the *Iugler*. *Sir*, (*said hee*,) *doe you remember whether he told the* Card, *the* Man *thought*, Himselfe, *or bade* Another *to tell it*. I answered (as was true,) *That he bade Another tell it*. Whereunto he said; *So I thought: For* (*said he*) *Himselfe could not have put on so strong an* Imagination; *But by telling the other the* Card, (*who beleeved that the* Jugler *was some Strange* Man, *& could doe Strange* Things,) *that other* Man *caught a strong* Imagination. I hearkened unto him, thinking for a Vanity he spoke prettily. Then he asked mee another *Question*: Saith he; *Doe you remember, whether he bad the* Man *think the* Card *first, and afterwards told the other* Man *in his Eare, what he should thinke*; *Or else that hee did whisper first in the* Mans *Eare, that should tell the* Card, *telling that such a* Man *should thinke such a* Card, *and after bade the* Man *thinke a* Card? I told him, as was true; *That he did first whisper the* Man *in the Eare, that such a* Man *should thinke such a* Card: upon this the *Learned Man* did much Exult, and Please himselfe, saying; *Loe, you may see that my* Opinion *is right: For if the* Man *had thought first, his* Thought *had beene fixed: But the other* Imagining *first, bound his* Thought. Which though it did somewhat sinke with mee, yet I made it Lighter than I thought, and said; *I thought it was* Confederacy, *betweene the* Juggler, *and the two* Servants: Though (indeed) I had no Reason so to thinke: For they were both my *Fathers* Servants; And hee had never plaid in the House before. The *Iuggler* also did cause a *Garter* to bee held up; And tooke upon him, to know, that such an *One*, should point in such a *Place*, of the *Garter*; As it should be neare so many *Inches* to the *Longer End*, and so many to the *Shorter*; And still hee did it, by *First Telling* the *Imaginer*, and after *Bidding* the *Actour Thinke*.

Having told this *Relation*, not for the Weight thereof, but because it doth handsomely open the *Nature* of the *Question*, I

returne to that I said; That *Experiments* of *Imagination*, must be practised by Others, and not by a *Mans* Selfe. For there bee Three *Meanes* to fortifie *Beleefe*: The First is *Experience*: The Second is *Reason*: And the Third is *Authoritie*: And that of these, which is farre the most *Potent*, is *Authoritie*: For *Beleefe* upon *Reason*, or *Experience*, will Stagger.

947 For *Authority*, it is of two Kinds; *Beleefe* in an *Art*; And *Beleefe* in a *Man*. And for Things of *Beleefe* in an *Art*; A *Man* may exercise them by *Himselfe*; But for *Beleefe* in a *Man*, it must be by *Another*. Therefore, if a *Man* beleeve in *Astrologie*, and finde a *Figure* Prosperous; Or beleeve in *Naturall Magick*, and that a *Ring* with such a *Stone*, or such a *Peece* of a *Living Creature*, Carried, will doe good; It may help his *Imagination*: But the *Beleefe* in a *Man* is farre the more *Active*. But howsoever, all *Authority* must bee out of a *Mans Selfe*, turned (as was said,) either upon an *Art*, or upon a *Man*: And where *Authority* is from one *Man* to another, there the Second must bee *Ignorant*, and not *Learned*, or *Full* of *Thoughts*; And such are (for the most part,) all *Witches*, and *Superstitious Persons*; Whose *Beleefes*, tied to their *Teachers*, and *Traditions*, are no whit controlled, either by *Reason*, or *Experience*: And upon the same Reason, in *Magicke*, they use (for the most part,) *Boyes*, and *Young People*; whose *Spirits* easilliest take *Beleefe*, and *Imagination*.

Now to fortifie *Imagination*, there be three wayes: The *Authoritie* whence the *Beleefe* is derived; *Meanes* to *Quicken* and *Corroborate* the *Imagination*; And *Meanes* to *Repeat* it, and *Refresh* it.

948 For the *Authoritie*, we have already spoken: As for the Second; Namely the *Meanes* to *Quicken* and *Corroborate* the *Imagination*; We see what hath been used in *Magick*; (If there be in those Practises any thing that is purely *Naturall*;) As *Vestments*; *Characters*; *Words*; *Seales*; Some parts of *Plants*, or *Living Creatures*; *Stones*; *Choice* of the *Houre*; *Gestures* and *Motions*; Also *Incenses*, and *Odours*; *Choice* of *Societie*, which increaseth *Imagination*; *Diets* and *Preparations* for some time before. And for *Words*, there have beene ever used, either *Barbarous Words*, of no Sense, lest they should disturb the *Imagination*; Or *Words* of *Similitude*, that may second and feed the *Imagination*: And this was ever as well in *Heathen Charmes*, as in *Charmes* of latter Times. There are used also *Scripture-Words*; For that the *Beleefe*, that *Religious Texts*, and *Words* have Power, may strengthen the *Imagination*. And for the same Reason, *Hebrew Words*, (which amongst us is counted the *Holy Tongue*, and the *Words* more *Mysticall*,) are often used.

949 For the *Refreshing* of the *Imagination*, (which was the Third *Meanes* of *Exalting* it;) We see the Practices of *Magicke*, as in *Images* of *Wax*, and the like, that should Melt by little, and little; Or some other *Things Buried* in *Mucke*, that should Putrifie by little and little; Or the like: For so oft as the *Imaginant* doth thinke of those Things, so oft doth hee represent to his *Imagination*, the *Effect* of that he desireth.

950 If there be any *Power* in *Imagination*, it is lesse credible, that it should bee so *Incorporeall* and *Immateriate* a *Vertue*, as to worke at great *Distances*; Or through all *Mediums*; Or upon all *Bodies*: But that the *Distance* must be competent; The *Medium* not Adverse; And the *Body* Apt and Proportionate. Therefore if there bee any Operation upon *Bodies*, in Absence by Nature;

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it is like to bee conveyed from *Man* to *Man*, as *Fame* is; As if a *Witch*, by *Imagination*, should hurt any a farre off, it cannot bee naturally, but by Working upon the *Spirit* of some, that commeth to the *Witch*; And from that *Party* upon the *Imagination* of *Another*; And so upon *Another*; till it come to one that hath resort to the *Partie Intended*; And so by *Him* to the *Partie intended himself*. And although they speake, that it sufficeth, to take a *Point*, or a *Peece* of the *Garment*, or the *Name* of the *Partie*, or the like; yet there is lesse Credit to be given to those Things, except it be by *Working* of evill *Spirits*.

The *Experiments*, which may certainly demonstrate the *Power* of *Imagination*, upon other *Bodies*, are few, or none: For the *Experiments* of *VVitchcraft*, are no cleare Proofes; For that they may bee, by a Tacite *Operation* of *Maligne Spirits*: Wee shall therefore be forced in this *Enquirie*, to resort to New *Experiments*: Wherein we can give onely *Directions* of *Trialls*, and not any *Positive Experiments*. And if any *Man* thinke, that we ought to have stayed, till wee had made *Experiment*, of some of them, our selves, (as we doe commonly in other *Titles*,) the Truth is, that these *Effects* of *Imagination* upon other *Bodies*, have so little Credit with us, as wee shall trie them at leisure: But in the meane Time, we will lead others the vvay.

951 When you worke by the *Imagination* of *Another*, it is necessary, that He, by whom you worke, have a *Precedent Opinion* of you, that you can doe Strange Things; Or that you are a *Man* of *Art*, as they call it; For else the Simple *Affirmation* to Another, that this or that shall bee, can worke but a weake *Impression*, in his *Imagination*.

952 It were good, because you cannot discerne fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did use the *Imagination* of more than *One*; That so you may light upon a *Strong One*. As if a *Physitian* should tell Three, or Foure, of his *Patients Servants*, that their *Master* shall surely recover.

953 The *Imagination* of *One*, that you shall use, (such is the Varietie of *Mens Mindes*,) cannot be alwayes alike *Constant*, and *Strong*; And if the Successe follow not speedily, it will faint and leese *Strength*. To remedy this, you must pretend to Him, whose *Imagination* you use, severall *Degrees* of *Means*, by which to *Operate*; As to prescribe him, that every Three Dayes, if hee finde not the Successe Apparent, he doe use another *Root*, or *Part* of a *Beast*, or *Ring*, &c. As being of more *Force*; And if that faile, Another; And if that, Another; till Seven Times. Also you must prescribe a good Large Time for the *Effect* you promise; As if you should tell a *Servant* of a *Sick-Man*, that his *Master* shall recover, but it will bee Fourteene dayes, ere he findeth it apparently, &c. All this to entertaine the *Imagination*, that it waver lesse.

954 It is certaine, that *Potions*, or *Things* taken into the *Body*: *Incenses* and *Perfumes* taken at the *Nosthrils*; And *Oyntments* of some *Parts*; doe (naturally) worke upon the *Imagination* of Him that taketh them. And therefore it must needs greatly *Cooperate* with the *Imagination* of him, whom you use, if you prescribe him, before he doe use the *Receit*, for the *Worke* which he desireth, that he doe take such a *Pill*, or a *Spoonfull* of *Liquour*; Or burne such an *Incense*; Or *Annoint* his *Temples*, or the *Soles* of his *Feet*, with such an *Oint-*

ment, or *Oyle*: And you must chuse, for the *Composition* of such *Pill*, *Perfume*, or *Oyntment*, such *Ingredients*, as doe make the *Spirits*, a little more *Grosse*, or *Muddy*; Whereby the *Imagination* will fix the better.

955 The *Body Passive*, and to be *Wrought Vpon*, (I meane not of the *Imaginant*,) is better wrought upon, (as hath beene partly touched) at some *Times*, than at others: as if you should prescribe a *Servant*, about a *Sicke Person*, (whom you have possessed, that his *Master* shall recover,) when his *Master* is fast asleepe, to use such a *Root*, or such a *Root*. For *Imagination* is like to worke better upon *Sleeping Men*, than *Men Awake*; As wee shall shew when wee handle *Dreames*.

956 We finde in the *Art* of *Memory*, that *Images Visible*, worke better than other *Conceits*: As if you would remember the Word *Philosophy*, you shall more surely doe it, by *Imagining*, that such a *Man*, (For *Men* are best *Places*,) is reading upon *Aristotles Physicks*; Than if you should Imagine him to say; *I'le goe study Philosophy*. And therefore, this *Observation* would bee translated to the *Subject* we now speak of: For the more Lustrous the *Imagination* is, it filleth and fixeth the better. And therefore I conceive, that you shall, in that *Experiment*, (whereof we spake before,) of *Binding* of *Thoughts*, lesse faile, if you tell One, that such an *One* shall name one of *Twenty Men*, than if it were *One* of *Twenty Cards*. The *Experiment* of *Binding* of *Thoughts*, would be Diversified, and tried to the Full: And you are to note, whether it hit for the most part, though not alwayes.

957 It is good to consider, upon what *Things*, *Imagination* hath most Force: And the *Rule*, (as I conceive,) is, that it hath most *Force* upon *Things*, that have the *Lightest*, and *Easiest Motions*. And therefore above all, upon the *Spirits* of *Men*: And in them, upon such *Affections*, as move *Lightest*; As upon *Procuring* of *Love*; *Binding* of *Lust*, which is ever with *Imagination*, upon *Men* in *Feare*; Or *Men* in *Irresolution*; And the like. Whatsoever is of this kinde would be thorowly enquired. *Trialls* likewise would bee made upon *Plants*, and that diligently: As if you should tell a *Man*, that such a *Tree* would Dye this yeare; And will him at these and these times, to goe unto it, to see how it thriveth. As for *Inanimate Things*, it is true, that the *Motions* of *Shuffling* of *Cards*, or *Casting* of *Dice*, are very *Light Motions*: And there is a *Folly* very usuall, that *Gamesters* imagine, that some that stand by them, bring them ill Luck. There would be Triall also made, of holding a *Ring* by a *Threed* in a *Glasse*, and telling him that holdeth it, before, that it shall strike so many times against the *Side* of the *Glasse*, and no more; Or of Holding a *Key* betweene two *Mens Fingers*, without a *Charme*; And to tell those that hold it, that at such *Name*, it shall goe off their *Fingers*: For these two are Extreme *Light Motions*. And howsoever I have no opinion of these things, yet so much I conceive to be true; That *Strong Imagination* hath more Force upon *Things Living*, Or that have beene *Living*, than *Things* meerely *Inanimate*: And more Force likewise upon *Light*, and *Subtill Motions*, than upon *Motions Vehement*, or *Ponderous*.

958 It is an usuall *Observation*, that if the *Body* of One *Murthered*, be brought before the *Murtherer*, the *Wounds* will bleed a-fresh. Some doe affirme, that the *Dead Body*, upon the Presence of the *Murtherer*, hath opened the *Eyes*; And that there have beene such like *Motions*, as well where the *Partie Murthered* hath beene *Strangled*, or *Drowned*, as where they have beene *Killed* by *Wounds*. It may be, that this participateth of a *Miracle*, by *Gods* Just Judgement, who usually bringeth *Murders* to Light: But if it be *Naturall*, it must be referred to *Imagination*.

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959

The *Tying* of the *Point* upon the day of *Marriage*, to make *Men* Impotent towards their *Wives*, which (as wee have formerly touched,) is so frequent in *Zant*, and *Gascony*, if it be *Naturall*, must be referred to the *Imagination* of *Him* that *Tieth* the *Point*. I conceive it to have the lesse Affinitie with *Witchcraft*, because not Peculiar Persons onely, (such as *Witches* are,) but any *Body* may doe it.

Experiments in Consort, touching the *Secret Vertue* of *Sympathy*, and *Antipathy*

960

THere be many *Things*, that worke upon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Precious Stones*, worne, have beene anciently and generally Received; And curiously assigned to worke severall *Effects*. So much is true; That *Stones* have in them fine *Spirits*; As appeareth by their *Splendour*: And therefore they may worke by *Consent* upon the *Spirits* of *Men*, to Comfort, and Exhilarate them. Those that are the best, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth Orientall*, and the *Gold-Stone*, which is the *Yellow Topaze*. As for their particular *Proprieties*, there is no Credit to be given to them. But it is manifest, that *Light*, above all things, excelleth in *Comforting* the *Spirits* of *Men*: And it is very probable, that *Light Varied* doth the same *Effect*, with more *Novelty*. And this is one of the *Causes*, why *Precious Stones* comfort. And therefore it were good to have *Tincted Lanthornes*, or *Tincted Skreenes*, of *Glasse Coloured* into *Greene*, *Blew*, *Carnation*, *Crimson*, *Purple*, &c. And to use them with *Candles* in the *Night*. So likewise to have Round *Glasses*, not onely of *Glasse Coloured thorow*, but with *Colours* laid betweene *Crystals*, with *Handles* to hold in ones Hand. *Prismes* are also Comfortable Things. They have of *Paris-Worke*, *Looking-Glasses*, bordered with broad *Borders* of small *Crystall*, and great Counterfeit *Precious Stones*, of all *Colours*, that are most Glorious and Pleasant to behold; Especially in the *Night*. The *Pictures* of *Indian Feathers*, are likewise Comfortable, and Pleasant to behold. So also Faire and Cleare *Pooles* doe greatly comfort the *Eyes*, and *Spirits*; Especially when the *Sunne* is not *Glaring*, but *Overcast*; Or when the Moone shineth.

961

There be divers Sorts of *Bracelets* fit to *Comfort* the *Spirits*; And they be of Three *Intentions*: *Refrigerant*; *Corroborant*; and *Aperient*. For *Refrigerant*, I wish them to be of *Pearle*, or of *Corall*, as is used: And it hath beene noted that *Corall*, if the *Party* that weareth it be ill disposed, will wax *Pale*: Which I beleeve to be true, because otherwise distemper of *Heat* will make *Corall* lose Colour. I Commend also *Beads*, or little *Plates* of *Lapis Lazuli*. And *Beads* of *Nitre*, either alone, or with some *Cordiall Mixture*.

962

For *Corroboration* & *Confortation*, take such *Bodies* as are of *Astringent Quality*, without Manifest *Cold*. I commend *Bead-Amber*, which is full of *Attrition*, but yet is *Vnctuous*, and not *Cold*; And is conceived to *Impinguate* those that weare such *Beads*: I commend also *Beads* of *Harts-Horne*, and *Ivory*, which are of the like Nature; Also *Orenge-Beads*; Also *Beads* of *Lignum Aloes*, *Macerated* first in *Rose-Water*, and *Dryed*.

963

For *Opening*, I Commend *Beads*, or *Peeces* of the *Roots* of *Carduus Benedictus*: Also of the *Roots* of *Piony* the *Male*; And of *Orris*; And of *Calamus Aromaticus*; And of *Rew*.

964

The Cramp, (no doubt) commeth of *Contraction* of *Sinewes*; Which is Manifest, in that it commeth either by *Cold*, or *Drinesse*; As after *Consumptions*, and *Long Agues*; For *Cold* and *Drinesse* doe (both of them) *Contract*, and *Corrugate*. Wee see also, that *Chafing* a little above the *Place* in paine, easeth the *Cramp*; Which is wrought by the *Dilatation*, of the *Contracted Sinewes*, by *Heat*. There are in use, for the Prevention of the *Cramp*, two Things;

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The one *Rings* of *Sea-Horse Teeth*, worne upon the *Fingers*; The other *Bands* of *Greene Perewinckle*, (the Herb,) tied about the *Calfe* of the *Leg*, or the *Thigh*, &c. where the *Cramp* useth to come. I doe finde this the more strange, because Neither of these have any *Relaxing Vertue*, but rather the Contrary. I judge therefore, that their *Working* is rather upon the *Spirits*, within the *Nerves*, to make them strive lesse; Than upon the *Bodily Substance* of the
965 *Nerves*.

I would have *Triall* made of two other *Kindes* of *Bracelets*, for *Comforting* the *Heart*, and *Spirits*; The one of the *Trochisch* of *Vipers*, made into little *Peeces* of *Beads*; For since they doe great Good Inwards, (especially for *Pestilent Agues*,) it is like they will be Effectuall Outwards; Where they may be applyed in greater *Quantity*. There would bee *Trochisch* likewise made of *Snakes*; Whose *Flesh dried*, is thought to have a very *Opening*, and *Cordiall Vertue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes*; Which is the Principall *Ingredient* in their *Cordiall Confection Alkermes*: The *Beads* would bee made up with *Amber-Grice*, and some
966 *Pomander*.

It hath beene long received, and confirmed by divers *Trialls*; That the Root of the *Male-Piony*, dried, tied to the *Necke*, doth help the *Falling-Sickneſſe*; And likewise the *Incubus*, which we call the *Mare*. The *Cause* of both these *Diseases*, and especially of the *Epilepsie* from the *Stomach*, is the *Grossenesse* of the *Vapours*, which rise and enter into the *Cells* of the *Braine*: And therefore the *Working* is, by *Extreme*, and *Subtill Attenuation*; Which that
967 *Simple* hath. I judge the like to bee in *Castoreum*, *Muske*, *Rew-Seed*, *Agnus Castus Seed*, &c.

There is a *Stone*, which they call the *Bloud-Stone*, which worne is thought to be good for them that *Bleed* at the *Nose*: Which (no doubt) is by *Astriction*, and *Cooling* of the *Spirits*. *Quære*, if the *Stone* taken out of the *Toads*
968 *Head*, be not of the like Vertue; For the *Toad* loveth *Shade*, and Cooleneſſe.

Light may be taken from the *Experiment* of the *Horse-Tooth-Ring*, and the *Garland* of *Periwinckle*, how that those things, which asswage the *Strife* of the *Spirits*, do help diseases, contrary to the *Intention* desired: for in the *Curing* of the *Cramp*, the *Intention* is, to relax the *Sinewes*; But the *Contraction* of the *Spirits*, that they strive lesse, is the best Help: So to procure easie *Travailes* of *Women*, the Intention is to bring down the *Childe*; But the best Help is, to stay the *Comming downe* too *Fast*: Whereunto they say, the *Toad-Stone* likewise helpeth. So in *Pestilent Feavers*, the *Intention* is to expell the *Infection* by *Sweat*, and *Evapouration*; But the best *Meanes* to doe it, is by *Nitre*, *Diascordium*, and other *Coole Things*, which doe for a time arrest the *Expulsion*, till *Nature* can doe it more quietly. For as one saith prettily; *In the Quenching of the Flame of a Pestilent Ague, Nature is like People that come to quench the Fire of a House; which are so busie, as one of them letteth another.* Surely, it is an Excellent *Axiome*, and of Manifold *Use*, that whatsoever appeaseth the *Contention* of the *Spirits*, furthereth their *Action*.

969 The *Writers* of *Naturall Magick*, commend the Wearing of the *Spoile* of a *Snake*, for *Preserving* of *Health*. I doubt it is but a *Conceit*; For that the Snake is thought to renue her *Youth*, by Casting her *Spoile*. They might as well take the *Beake* of an *Eagle*, or a Peece of a *Harts-Horne*, because those Renue.

970 It hath beene Anciently *Received*, (For *Pericles* the *Athenian* used it,) and it is yet in use, to weare little *Bladders* of *Quick-Silver*, or *Tables* of *Arsenicke*, as *Preservatives* against the *Plague*: Not as they conceive, for any *Comfort* they yeeld to the *Spirits*, but for that being *Poysons* themselves, they draw the *Venome* to them, from the *Spirits*.

Vide

Vide the *Experiments* 95. 96. and 97. touching the *Severall Sympathies*, and *Antipathies*, for *Medicinall Vse*. 971

It is ſaid, that the *Guts* or *Skin* of a *Wolfe* being applyed to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beaſt* of great *Edacitie* and *Diſgeſtion*; And ſo, it may be, the *Parts* of him comfort the *Bowels*. 972

We ſee *Scare-Crowes*, are ſet up to keep *Birds* from *Corne*, and *Fruit*; It is reported by ſome, that the *Head* of a *Wolfe*, whole, dried, and hanged up in a *Dove-Houſe*, will ſcare away *Vermine*; Such as are *Weaſils*, *Polcats*, and the like. It may be, the *Head* of a *Dog* will doe as much; For thoſe *Vermine* with us, know *Dogs* better than *Wolves*. 973

The *Braines* of ſome *Creatures*, (when their *Heads* are roaſted) taken in *Wine*, are ſaid to ſtrengthen the *Memory*: As the *Braines* of *Hares*; *Braines* of *Hens*; *Braines* of *Deeres*, &c. And it ſeemeth to bee incident to the *Braines* of thoſe *Creatures*, that are Fearefull. 974

The *Ointment*, that *Witches* uſe, is reported to be made, of the *Fat* of *Children*, digged out of their *Graves*; Of the *Iuyces* of *Smallage*, *Wolfe-Bane*, and *Cinquefoile*; Mingled with the *Meale* of fine *Wheat*. But I ſuppoſe, that the *Soporiferous Medicines* are likeſt to doe it; Which are *Henbane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Saffron*, *Poplar-Leaves*, &c. 975

It is reported by ſome, that the *Affections* of *Beaſts*, when they are in Strength, doe adde ſome *Vertue*, unto *Inanimate Things*; As that the *Skin* of a *Sheep*, devoured by a *Wolfe*, moveth *Itching*; That a *Stone* bitten by a *Dog* in Anger, being throwne at him, drunke in *Powder*, provoketh *Choler*. 976

It hath beene obſerved, that the *Diet* of *Women* with *Childe*, doth worke much upon the *Infant*; As if the *Mother* eate *Quinces* much, and *Coriander-Seed*, (the *Nature* of both which is to repreſſe and ſtay *Vapours*, that aſcend to the *Braine*,) it will make the *Childe* Ingenious: And on the contrarie ſide, if the *Mother* eat (much) *Onions*, or *Beanes*, or ſuch *Vapourous Food*; Or drinke *Wine*, or *Strong Drinke*, immoderately; Or *Faſt* much; Or bee given to much *Muſing*; (All which ſend, or draw *Vapours* to the *Head*,) It endangereth the *Childe* to become *Lunaticke*, or of *Imperfect Memory*: And I make the ſame Judgement of *Tobacco*, often taken by the *Mother*. 977

The *Writers* of *Naturall Magick* report, that the *Heart* of an *Ape*, worne neare the *Heart*, comforteth the *Heart*, and increaſeth *Audacity*. It is true, that the *Ape* is a Merry and Bold *Beaſt*. And that the ſame *Heart* likewiſe of an *Ape* applyed to the *Necke*, or *Head*, helpeth the *Wit*; And is good for the *Falling-Sickneſſe*: The *Ape* alſo is a Witty *Beaſt*, and hath a *Drie Braine*; Which may be ſome *Cauſe* of *Attenuation* of *Vapours* in the *Head*. Yet it is ſaid to move *Dreames* alſo. It may be the *Heart* of a *Man* would doe more, but that it is more againſt *Mens* mindes to uſe it; Except it bee in ſuch as weare the *Reliques* of *Saints*. 978

The *Fleſh* of a *Hedge-Hog*, Dreſſed, and Eaten, is ſaid to be a great *Drier*: It is true, that the *Iuyce* of a *Hedge-Hog*, muſt needs bee *Harſh*, and *Drie*, becauſe it putteth forth ſo many *Prickles*: For *Plants* alſo, that are full of *Prickles*, are generally Dry: As *Briars*, *Thornes*, *Berberries*: And therefore the *Aſhes* of an *Hedge-Hog* are ſaid to be a great *Deſiccative* of *Fiſtula's*. 979

Mummy hath great force in *Stanching* of *Bloud*; which, as it may be aſcribed to the *Mixture* of *Balmes*, that are *Glutinous*; So it may alſo partake of a Secret *Proprietie*; In that the *Bloud* draweth *Mans Fleſh*. And it is approved, that the *Moſſe*, which groweth upon the *Skull* of a *Dead Man* unburied, will ſtanch *Bloud* Potently. And ſo doe the *Dregs*, or *Powder* of *Bloud*, ſevered from the *Water*, and *Dried*. 980

It

981 It hath beene practiſed, to make *White Swallowes*, by *Anointing* of the *Egs* with *Oyle*. Which *Effect* may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Iuyce*, that putteth forth the *Feathers* afterwards, more Penurious. And it may be, the *Annointing* of the *Egs*, will be as Effectuall, as the *Annointing* of the *Body*; Of which *Vide* the *Experiment* 93.

982 It is reported, that the *White* of an *Egge*, or *Bloud*, mingled with *Salt-Water*, doth gather the *Saltneſſe*, and maketh the *Water* ſweeter. This may be by *Adheſion*; As in the 6. *Experiment* of *Clarification*: It may be alſo, that *Bloud*, and the *White* of an *Egge*, (which is the *Matter* of a *Living Creature*,) have ſome *Sympathy* with *Salt*: For all *Life* hath a *Sympathy* with *Salt*. Wee ſee that *Salt*, laid to a *Cut Finger*, healeth it: So as it ſeemeth *Salt* draweth *Bloud*, as well as *Bloud* draweth *Salt*.

983 It hath beene anciently received, that the *Sea Hare*, hath an *Antipathy* with the *Lungs*, (if it commeth neare the Body,) and erodeth them. Whereof the *Cauſe* is conceived to be, a *Qualitie* it hath of *Heating* the *Breath*, and *Spirits*; As *Cantharides* have upon the *Watry Parts* of the *Body*; As *Vrine* and *Hydropicall Water*. And it is a good *Rule*, that whatſoever hath an *Operation* upon certaine *Kindes* of *Matters*, that, in *Mans Body*, worketh moſt upon thoſe *Parts*, wherein that kinde of *Matter* aboundeth.

984 Generally, that wich is *Dead*, or *Corrupted*, or *Excerned*, hath *Antipathy* with the ſame *Thing*, when it is *Alive*, and when it is *Sound*; And with thoſe *Parts* which doe *Excerne*: As a *Carkaſſe* of *Man* is moſt *Infectious*, and *Odious* to *Man*; A *Carrion* of an *Horſe* to an *Horſe*, &c. *Purulent Matter* of *Wounds*, and *Vlcers*, *Carbuncles*, *Pocks*, *Scabs*, *Leproſie*, to *Sound Fleſh*; And the *Excrement* of every *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are leſſe Pernicious than the *Corruptions*.

985 It is a Common *Experience*, that *Dogs* know the *Dog-Killer*; When as in times of *Infection*, ſome Petty *Fellow* is ſent out to kill the *Dogs*; And that, though they have never ſeene him before, yet they will all come forth, and barke, and flie at him.

986 The *Relations* touching the *Force* of *Imagination*, and the *Secret Inſtincts* of *Nature*, are ſo uncertaine, as they require a great deale of *Examination*, ere we conclude upon them. I would have it firſt thorowly inquired, whether there be any Secret Paſſages of *Sympathy*, between *Perſons* of *neare Bloud*; As *Parents*, *Children*, *Brothers*, *Siſters*, *Nurſe-Children*, *Husbands*, *Wives*, &c. There be many Reports in *Hiſtorie*, that upon the *Death* of *Perſons* of ſuch Neareneſſe, *Men* have had an inward *Feeling* of it. I my Selfe remember, that being in *Paris*, and my *Father* dying in *London*, two or three dayes before my *Fathers* death, I had a *Dreame*, which I told to divers *Engliſh Gentlemen*; That my *Fathers Houſe*, in the *Country*, was *Plaiſtered* all over with *Blacke Mortar*. There is an Opinion abroad, (whether idle or no I cannot ſay,) That loving and kinde *Husbands*, have a *Senſe* of their *Wives breeding Childe*, by ſome *Accident* in their owne *Bodie*.

987 Next to thoſe that are *Neare* in *Bloud*, there may be the like *Paſſage*, and *Inſtincts* of *Nature*, betweene great *Friends*, and *Enemies*: And ſometimes the Revealing is unto Another *Perſon*, and not to the *Partie* Himſelfe. I remember *Philippus Commineus*, (a grave Writer,) reporteth; That the *Arch-Biſhop* of *Vienna*, (a *Reverend Prelate*,) ſaid (one day) after *Maſſe*, to *King Lewis* the eleventh of *France*; *Sir, your Mortall Enemy is dead*; What time *Duke Charles* of *Burgundy* was Slain, at the *Battell* of *Granſon*, againſt the *Switzers*. Some triall alſo would be made, whether *Pact* or *Agreement* doe any thing; As if two *Friends* ſhould agree, that ſuch a *Day* in every *Weeke*, they

being

being in farre *Distant Places*, should *Pray* one for Another, Or should put on a *Ring*, or *Tablet*, one for anothers Sake; Whether if one of them should breake their *Vow* and *Promise*, the other should have any *Feeling* of it, in *Absence*.

If there be any *Force* in *Imaginations* and *Affections* of *Singular Persons*; It 988
is Probable the *Force* is much more in the *Ioynt Imaginations* and *Affections* of *Multitudes*: As if a *Victory* should be won, or lost, in *Remote Parts*, whether is there not some *Sense* thereof, in the *People* whom it concerneth; Because of the great *Ioy*, or *Griefe*, that many *Men* are possest with at once? *Pius Quintus*, at the very time, when that Memorable *Victory* was won, by the *Christians*, against the *Turkes*, at the *Navall* Battell of *Lepanto*, being then hearing of *Causes* in *Consistory*, brake off suddenly, and said to those about him, *It is now more time we should give thankes to God, for the great Victory he hath granted us, against the Turks*; It is true, that *Victory* had a *Sympathy* with his *Spirit*; For it was meerely his Worke, to conclude that *League*. It may be, that *Revelation* was *Divine*; But what shall we say then, to a Number of *Examples*, amongst the *Grecians*, and *Romans*? Where the *People*, being in *Theaters* at *Playes*, have had Newes of *Victories*, and *Overthrowes*, some few dayes, before any *Messenger* could come.

It is true, that that may hold in these Things, which is the generall *Root* of *Superstition*: Namely, that *Men* observe when *Things Hit*, and not when they *Misse*: And commit to Memorie the one, and forget and passe over the other. But touching *Divination*, and the *Misgiving* of *Mindes*, we shall speake more, when we handle in generall the *Nature* of *Mindes*, and *Soules*, and *Spirits*.

We have given formerly some *Rules* of *Imagination*; And touching the 989
Fortifying of the Same. We have set downe also some few *Instances*, and *Directions*, of the *Force* of *Imagination*, upon *Beasts*, *Birds*, &c. upon *Plants*; And upon *Inanimate Bodies*: Wherin you must still observe, that your *Trialls* be upon *Subtill* and *Light Motions*, and not the contrary; For you will sooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating*, or *Flying*: And I leave it to every *Man*, to choose *Experiments*, which himselfe thinketh most Commodious; Giving now but a few *Examples* of every of the Three Kindes.

Use some *Imaginant*, (observing the *Rules*, formerly prescribed,) for *Bind-* 990
ing of a *Bird* from *Singing*; And the like of a *Dogge* from *Barking*. Trie also the *Imagination* of some, whom you shall accommodate with things to fortifie it, in *Cocke-Fights*, to make one *Cocke* more Hardy, and the other more Cowardly. It would be tried also, in *Flying* of *Hawkes*; Or in *Coursing* of a *Deere*, or *Hart*, with *Grey-Hounds*; Or in *Horse-Races*; And the like *Comparative Motions*: For you may sooner by *Imagination*, quicken or slacke a *Motion*, than raise or cease it; As it is easier to make a *Dogge* goe slower, than to make him stand still that he may not runne.

In *Plants* also, you may trie the *Force* of *Imagination*, upon the *Lighter* 991
Sort of *Motions*: As upon the Sudden *Fading*, or Lively *Comming up* of *Herbs*; Or upon their *Bending* one way, or other; Or upon their *Closing*, and *Opening*; &c.

For *Inanimate Things*, you may trie the *Force* of *Imagination*, upon Staying 992
the

the *Working* of *Beere*, when the *Barme* is put in; Or upon the *Comming* of *Butter*, or *Cheese*, after the *Cherming*, or the *Rennet* be put in.

993 It is an Ancient *Tradition*, everie where alleaged, for *Example* of *Secret Proprieties* and *Influxes*, that the *Torpedo Marina*, if it be touched with a long Sticke, doth stupifie the *Hand* of him that toucheth it. It is one degree of *Working* at *Distance*, to work by the Continuance of a Fit *Medium*; As *Sound* will be conveyed to the *Eare*, by striking upon a *Bow-String*, if the *Horne* of the *Bow* be held to the *Eare*.

994 The *Writers* of *Naturall Magick*, doe attribute much to the *Vertues*, that come from the *Parts* of *Living Creatures*; So as they bee taken from them, the *Creatures* remaining still alive: As if the *Creature* still living did infuse some *Immateriate Vertue*, and *Vigour* into the *Part Severed*. So much may be true; that any *Part*, taken from a *Living Creature*, newly *Slaine*, may bee of greater force, than if it were taken from the like *Creature*, *dying* of it *Selfe*, because it is fuller of *Spirit*.

995 Triall would be made, of the like *Parts* of *Individualls*, in *Plants*, and *Living Creatures*; As to cut off a *Stock* of a *Tree*; And to lay that, which you cut off, to *Putrifie*, to see whether it will Decay the Rest of the *Stocke*: Or if you should cut off part of the *Taile*, or *Legge* of a *Dogge*, or a *Cat*, and lay it to *Putrifie*, and so see whether it will *Fester*, or keepe from *Healing*, the *Part* which remaineth.

996 It is received, that it helpeth to *Continue Love*, if one weare a *Ring*, or a *Bracelet* of the *Haire* of the *Party Beloved*. But that may be by the *Exciting* of the *Imagination*: And perhaps a *Glove*, or other like *Favour*, may as well doe it.

997 The *Sympathie* of *Individuals*, that have beene *Entire*, or have *Touched*, is of all others the most *Incredible*: Yet according unto our faithfull Manner of *Examination* of *Nature*, we will make some little mention of it. The *Taking away* of *Warts*, by *Rubbing* them with Somewhat that afterwards is put to waste, and consume, is a Common *Experiment*: And I doe apprehend it the rather, because of mine owne *Experience*. I had, from my *Childhood*, a *Wart* upon one of my *Fingers*: Afterwards when I was about Sixteen Yeares old, being then at *Paris*, there grew upon both my *Hands* a Number of *Warts*, (at the least an hundred,) in a Months space. The *English Embassadours Lady*, who was a *Woman* farre from *Superstition*, told me, one day; She would helpe me away with my *Warts*: Whereupon she got a *Peece* of *Lard*, with the *Skin* on, and rubbed the *Warts* all over with the *Fat Side*; And amongst the rest, that *Wart* which I had had from my *Childhood*; Then shee nailed the *Peece* of *Lard*, with the *Fat* towards the *Sunne*, upon a *Poast* of her *Chamber Window*, which was to the *South*. The Successe was, that within five weekes space, all the *Warts* went quite away: And that *Wart*, which I had so long endured, for Company. But at the rest I did little marvell, because they came in a Short time, and might goe away in a Short Time againe: But the Going away of that, which had staid so long, doth yet stick with me. They say the like is done by the *Rubbing* of *Warts* with a Green *Elder Sticke*, and then *Burying* the *Stick* to *Rot* in *Muck*. It would be tried, with *Cornes*, and *Wenns*, and such other *Excrescences*. I would have it also tried, with some *Parts* of *Living Creatures*, that are nearest the *Nature* of *Excrescences*; As the *Combs* of *Cocks*, the *Spurres* of *Cocks*, the *Hornes* of *Beasts*, &c. And I would have it tried both wayes; Both by *Rubbing* those *Parts* with *Lard*, or *Elder*, as before; And by *Cutting off* some *Peece* of those *Parts*, and laying it to *Consume*. To see whether it will Worke any Effect, towards the *Consumption* of that *Part*, which was once *Ioyned* with it.

It

998

It is constantly Received, and Avouched, that the *Anointing* of the *Weapon*, that maketh the *Wound*, will heale the *Wound* it selfe. In this *Experiment*, upon the Relation of *Men* of *Credit*, (though my selfe, as yet, am not fully inclined to beleeve it,) you shall note the *Points* following, First, the *Ointment*, wherewith this is done, is made of Divers *Ingredients*; whereof the Strangest and Hardest to come by, are the *Mosse* upon the *Skull* of a *dead Man*, *Vnburied*; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. These two last I could easily suspect to be prescribed as a Starting Hole; That if the *Experiment* proved not, it mought be pretended, that the *Beasts* were not killed in the due Time; For as for the *Mosse*, it is certain, there is great Quantity of it in *Ireland*, upon *Slaine Bodies*, laid on *Heaps*, *Vnburied*.) The other *Ingredients* are, the *Bloud-Stone* in *Powder*, and some other *Things*, which seeme to have a *Vertue* to *Stanch Bloud*; As also the *Mosse* hath. And the *Description* of the *whole Ointment* is to be found in *Chymicall Dispensatorie* of *Crollius*. Secondly, the same *Kinde* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*; but onely applied to the *Weapon*. Thirdly, (which I like well) they doe not observe the *Confecting* of the *Ointment*, under any certaine *Constellation*; which commonly is the Excuse of *Magicall Medicines*, when they faile, that they were not made under a fit *Figure* of *Heaven*. Fourthly, it may bee applied to the *Weapon*, though the *Party Hurt* be at great *Distance*. Fiftly, it seemeth the *Imagination* of the Partie, to be *Cured*, is not needfull to Concurre; For it may be done, without the Knowledge, of the *Partie Wounded*; And thus much hath been tried, that the *Ointment* (for *Experiments* sake,) hath been wiped off the *Weapon*, without the Knowledge of the *Partie Hurt*, and presently the *Partie Hurt*, hath beene in great *Rage* of *Paine*, till the *Weapon* was *Reannointed*. Sixtly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Instrument* of *Iron*, or *Wood*, resembling the *Weapon*, into the *Wound*, whereby it bleedeth, the *Annointing* of that *Instrument* will serve, and worke the *Effect*. This I doubt should be a Device, to keepe this strange *Forme* of *Cure*, in Request, and Use; Because many times you cannot come by the *Weapon* it selfe, Seventhly, the *Wound* must be at first *Washed cleane*, with *White Wine*, or the *Parties* owne *Water*; And then bound up close in *Fine Linnen*, and no more *Dressing* renewed, till it be *whole*. Eighthly, the *Sword* it selfe must be *Wrapped* up *Close*, as farre as the *Ointment* goeth, that it taketh no *Wind*. Ninthly, the *Ointment*, if you *wipe* it off from the *Sword*, and keepe it, will *Serve againe*; and rather *Increase* in *Vertue*, than *Diminish*. Tenthly, it will *Cure* in farre *Shorter Time*, than *Ointment* of *Wounds* commonly doe. Lastly, it will *Cure* a *Beast*, as well as a *Man*; which I like best of all the rest, because it subjecteth the *Matter*, to an *Easie Triall*.

Experiment Solitary, touching *Secret Proprieties*.

999

I Would have *Men* know, that though I reprehend, the *Easie Passing over*, of the *Causes* of *Things*, by Ascribing them to *Secret* and *Hidden Vertues*, and *Proprieties*; (For this hath arrested, and laid asleepe, all true *Enquiry*, and *Indications*;) yet I doe not understand, but that in the *Practicall Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot so fully reach: And this not onely in *Specie*, but in *Individuo*. So in *Physicke*, if you will cure the *Iaundies*, it is not enough to say, that the *Medicine* must not be Cooling; For that will hinder the *Opening* which the *Disease* requireth; That it must not be *Hot*; For that will exasperate *Choler*: That it must goe to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receive from *Experience*, that *Powder* of *Chamæpytis*,

or the like, drunke in *Beere*, is good for the *Iaundies*: So againe, a wise *Physitian* doth not continue still the same *Medicine*, to a *Patient*; But he will vary, if the first *Medicine* doth not apparently succeed: For of those *Remedies* that are good for the *Iaundies*, *Stone*, *Agues*, &c. that will doe good in one *Body*, which will not do good in another; According to the Correspondence the *Medicine* hath to the *Individuall body*.

Experiment Solitary, touching the *Generall Sympathy* of *Mens Spirits*. 1000

THe *Delight* which *Men* have in *Popularitie*, *Fame*, *Honour*, *Submission*, and *Subjection* of other *Mens Mindes*, *Wills*, or *Affections* (although these *Things* may be desired for other *Ends*,) seemeth to be a *Thing*, in it selfe, without Contemplation of Consequence, Gratefull and agreeable to the *Nature* of *Man*. This Thing (surely) is not without some Signification, as if all *Spirits* and *Soules* of *Men*, came forth out of one *Divine Limbus*; Else why men be so much affected with that, which others thinke, or say? The best Temper of *Mindes* desireth *Good Name*, and *True Honour*: The Lighter, *Popularitie*, and *Applause*; The more depraved: *Subjection*, and *Tyranny*; As is seene in great *Conquerours*, and *Troublers* of the *World*: And yet more in *Arch-Heretickes*; for the Introducing of new *Doctrines*, is likewise an *Affectation* of *Tyranny*, over the *Vnderstandings*, and *Beleefes* of *Men*.

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FINIS.

His Lops. Vsuall Receipt for the Gout, to which the Sixtieth Experiment hath reference, was this.

To be taken in this Order.

1. The Pultasse.

℞. *Of Manchett, about 3. Ounces, the Crumme onely, thin cut; Let it bee boyled in Milk, till it grow to a Pulp. Adde, in the end, a Dramme, and an halfe, of the powder of Red Roses.*
Of Saffron 10. *Graines.*
Of Oyle of Roses an Ounce.
Let it be spread upon a Linnen Cloth, and applied luke-warme; And continued for three Houres space.

2. The Bath, or Fomentation.

℞. *Of Sage-Leaves, halfe a handfull.*
Of the Root of Hemlock, Sliced, 6. Drams.
Of Briony Roots, half an Ounce.
Of the Leaves of Red Roses, 2. Pugills.
Let them be boyled in a pottle of Water, wherein Steele hath beene quenched, till the Liquour come to a quart. After the Straining, put in halfe a handfull of Bay-Salt.
Let it be used, with Scarlet Cloth or Scarlet Wooll, dipped in the Liquour, hot, and so renewed seven times; All in the space of a quarter of an Houre, or little more.

3. The Plaster.

℞. Emplastrum Diacalciteos, *as much as is sufficient, for the part you meane to cover. Let it be dissolved with Oyle of Roses, in such a Consistence, as will sticke; And spred upon peece a of Holland, and applyed.*

His Lo^ps Vsuall Receipt for the Gout, to which the Sixteenth Experiment hath reference, viz.

To be taken in this Order.

1. The Purge.

℞. Of Manchet, about 3 Ounces, the Crumme onely, thin cut; Let it be boyled in Milk, till it grow to a Pulp. Adde, in the end, a Drachme, and an half, of the powder of Red Roses.
Of Saffron 10. Grains.
Of Oyle of Roses an Ounce.
Let it be spread upon a Linnen Cloth, and applied luke-warme; And continued for three Houres Space.

2. The Bath, or Fomentation.

℞. Of Sage Leaves, half a handfull.
Of the Root of Hemlock, Sliced, 6. Drams.
Of Briony Roots, half an Ounce.
Of the Leaves of Red Roses, 2. Pugills.
Let them be boyled in a pottle of Water, wherein Steele hath been quenched, till the Liquour come to a quart. After the Straining, put in half a handfull of Bay-Salt.
Let it be used, with Scarlet Cloth or Scarlet Wooll, dipped in the Liquour, hot, and so renewed seven times; All in the space of a quarter of an Houre, or little more.

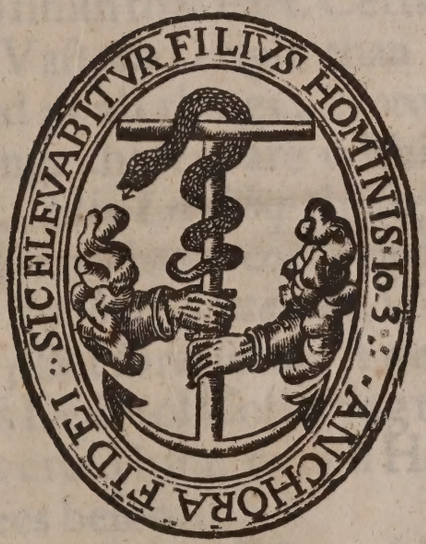
3. The Plaster.

℞. Emplastrum Diacalcitheos, a remedy as [illegible], for the part You mean to cover. Let it be diffused with Oyle of Roses, in such a Consistence, as will stricke; And spread upon peece of Holland, and applyed.

NEVV
ATLANTIS.

A Worke unfinished.

VVritten by the Right Honourable, FRANCIS,
Lord Verulam, Viscount S^t^. *Alban.*



NEVV ATLANTIS.

A VVorke unfinished.

VVritten by the Right Honourable FRANCIS, Lord Verulam, Viscount St. Albon.

To the Reader.

THis *Fable* my *Lord* deviſed, to the end that Hee might exhibit therein, a *Modell* or *Deſcription* of a *College*, inſtituted for the *Interpreting* of *Nature*, and the Producing of *Great* and *Marvellous Workes*, for the *Benefit* of *Men*; Vnder the Name of *Salomons Houſe*, or the *College of the Six Dayes Workes*. And even ſo farre his *Lordſhip* hath proceeded, as to finiſh that Part. Certainly the Modell is more Vaſt, and High, than can poſſibly be imitated in all things; Notwithſtanding moſt Things therein are within Mens Power to effect. His *Lordſhip* thought alſo in this preſent *Fable*, to have compoſed a *Frame* of *Lawes*, or of the *beſt State* or *Mould* of a *Common-wealth*; But fore-ſeeing it would be a long VVork, his Deſire of Collecting the *Naturall Hiſtory* diverted him, which He preferred many degrees before it.

This VVorke of the *New Atlantis* (as much as concerneth the *Engliſh Edition*) his *Lordſhip* deſigned for this place; In regard it hath ſo neare Affinitie (in one part of it) with the Preceding *Naturall Hiſtory*.

W. Rawley.

To the Reader.

THis Fable my Lord devised, to the end that Hee might exhibit therein, a Model or Description of a College, instituted for the Interpreting of Nature, and the Producing of Great and Marvellous Works, for the Benefit of Men; Under the Name of Solomons House, or the College of the Six Dayes Works. And even so fare his Lordship hath proceeded, as to finish that Part. Certainly the Model is more Vast, and High, than can possibly be imitated in all things; Notwithstanding most Things therein are within Mens Power to effect. His Lordship thought also in this present Fable, to have compoled a Frame of Lawes, or of the best State or Monarchy of a Common-Wealth; But fore-seeing it would be a long Worke, his Desire of Collecting the Naturall History diverted him, which He preferred many degrees before it.

This Worke of the New Atlantis (as much as concerneth the English Edition) his Lordship designed for this place; In regard it hath so neare Affinitie (in one part of it) with the Preceding Natural History.

NEW ATLANTIS

WE Sailed from *Peru*, (where we had continued by the space of one whole yeare,) for *China* and *Iapan*, by the South Sea; taking with us Victuals for twelve Moneths; And had good Winds from the East, though soft and weake, for five Moneths space and more. But then the Wind came about, and setled in the West for many dayes, so as we could make little or no way, and were sometimes in purpose to turne backe. But then againe there arose Strong and Great winds from the South, with a Point East; which carried us up, (for all that we could doe) towards the North: By which time our Victuals failed us, though wee had made good spare of them. So that finding our selves, in the Midst of the greatest Wildernesse of waters in the world, without Victuall, wee gave our Selves for lost Men, and prepared for death. Yet we did lift up our Hearts and Voices to GOD above, *who sheweth his Wonders in the Deepe*; Beseeching him of his Mercy, that as in the *Beginning* He discouered the *Face* of the *Deepe*, and brought forth *Drie-Land*; So he would now discover Land to us, that we mought not perish. And it came to passe, that the next day about Evening, we saw within a Kenning before us, towards the North, as it were thicke-Clouds, which did put us in some hope of Land; Knowing how that part of the South-Sea was utterly unknowne; And might have Islands or Continents, that hitherto were not come to light. Wherefore we bent our course thither, where wee saw the appearance of Land, all that night; And in the Dawning of the next Day, wee might plainly discerne that it was a Land, Flat to our sight, and full of Boscage; which made it shew the more Darke. And after an Houre and a halfes Sayling, wee entred

tred into a good *Hauen*, being the Port of a faire *City*: Not great indeed, but well built, and that gave a pleasant view from the Sea: And we thinking every Minute long, till wee were on Land, came close to the Shore and offered to land. But straightwayes wee saw divers of the People, with Bastons in their Hands, (as it were) forbidding vs to land; Yet without any Cryes or Fiercenesse, but only as warning vs off, by Signes that they made. Whereupon being not a little discomforted, wee were advising with our selves, what wee should doe. During which time, there made forth to us a small Boat, with about eight Persons in it; whereof One of them had in his Hand a Tipstaffe of of a yellow Cane, tipped at both ends with Blew, who made aboard our Ship, without any shew of Distrust at all. And when he saw one of our Number, present himselfe somewhat afore the rest, hee drew forth a little Scroule of Parchment (somewhat yellower than our Parchment, and shining like the Leaves of Writing Tables, but otherwise soft and flexible,) and delivered it to our formost Man. In which Scroule were written in Ancient *Hebrew*, and in Ancient *Greeke*, and in good *Latine* of the Schoole, and in *Spanish* these words; *Land ye not, none of you, and provide to be gone, from this Coast, within sixteen dayes, except you have further time given you: Meane-while, if you want Fresh Water, or Victuall, or helpe for your Sicke, or that your Ship needeth repaire, write downe your wants, and you shall have that which belongeth to Mercy.* This Scroule was signed with a Stamp of *Cherubims Wings*, not spred, but hanging downwards; And by them a *Crosse*. This being delivered, the *Officer* returned, and left onely a Servant with us to receive our Answer. Consulting hereupon amongst our Selves, wee were much perplexed. The Deniall of Landing, and Hasty Warning us away, troubled us much; On the other side, to finde that the People had Languages, and were so full of Humanity, did comfort us not a little. And above all, the Signe of the *Crosse* to that Instrument, was to us a great Rejoycing, and as it were a certaine Presage of Good. Our Answer was in the *Spanish* tongue; *That for our Ship, it was well; For we had rather met with Calmes and contrary winds, than any Tempests. For our Sicke, they were many, and in very ill Case; So that if they were not permitted to Land, they ranne danger of their Lives.* Our other Wants wee set downe in particular, adding; *That we had some little store of Merchandize, which if it pleased them to deale for, it might supply our Wants, without being chargeable*

ble unto them. Wee offered ſome Reward in Piſtolets unto the Servant, and a peece of Crimſon Velvet to bee preſented to the *Officer:* But the Servant tooke them not, nor would ſcarce looke upon them; And ſo left us, and went back in another little Boat which was ſent for him.

About three Houres after wee had diſpatched our Anſwer, there came towards us, a Perſon (as it ſeemed,) of place. Hee had on him a Gowne with wide Sleeves, of a kinde of Water Chamolet, of an excellent Azure Colour, farre more gloſſy than ours: His under Apparell was greene; and ſo was his Hat, being in the forme of a Turban, daintily made, and not ſo huge as the *Turkiſh* Turbans; And the Locks of his Haire came down below the Brimmes of it. A Reverend Man was he to behold. Hee came in a Boat, gilt in ſome part of it, with foure Perſons more onely in that Boat; And was followed by another Boat, wherein were ſome Twenty. When hee was come within a Flight-ſhot of our Ship, Signes were made to us, that we ſhould ſend forth ſome to meet him upon the water, which we preſently did in our Ship-Boat, ſending the principall Man amongſt us ſave one, and foure of our Number with him. When wee were come within ſixe yards of their Boat, they called to us to ſtay, and not to approach further, which we did. And thereupon the Man, whom I before deſcribed, ſtood up, and with a loud voice in *Spaniſh*, asked, *Are ye Chriſtians?* Wee anſwered; *We were*; fearing the leſſe, becauſe of the *Croſſe* we had ſeene in the Subſcription. At which Anſwer the ſaid Perſon lift up his Right Hand towards Heaven, and drew it ſoftly to his Mouth (which is the Geſture they uſe, when they thanke GOD;) And then ſaid: *If ye will ſweare, (all of you,) by the Merits of the* SAVIOUR, *that ye are no Pirates; Nor have ſhed bloud, lawfully, nor unlawfully, within forty dayes paſt; you may have Licenſe to come on Land.* We ſaid; *We were all ready to take that Oath.* Whereupon one of thoſe that were with him, being (as it ſeemed) a *Notary*, made an Entry of this Act. Which done, another of the Attendants of the Great Perſon, which was with him in the ſame Boat, after his Lord had ſpoken a little to him, ſaid aloud; *My Lord would have you know, that it is not of Pride, or Greatneſſe, that he commeth not aboard your Ship; But for that, in your Anſwer, you declare, that you have many Sicke amongſt you, he was warned by the* Conſervatour *of* Health, *of the* City, *that hee ſhould keepe a diſtance.* Wee bowed our ſelves towards him, and anſwered; *Wee*

were

were his humble Servants; And accounted for great Honour, and singular Humanitie towards us, that which was already done; But hoped well, that the Nature of the Sickneſſe, of our Men, was not infectious. So he returned; And a while after came the *Notary* to us aboard our Ship; Holding in his hand a Fruit of that Country, like an Orenge, but of colour between Orenge-tawny and Scarlet; which caſt a moſt excellent Odour. Hee uſed it (as it ſeemeth) for a Preſervative againſt Infection. He gave us our Oath; *By the Name of Jeſus, and his Merits:* And after told us, that the next day by ſixe of the Clocke in the Morning, wee ſhould be ſent to, and brought to the *Strangers Houſe*, (ſo hee called it,) where we ſhould be accommodated of things, both for our Whole, and for our Sicke. So he left us; And when we offered him ſome Piſtolets, he ſmiling, ſaid; *Hee muſt not bee twice paid for one Labour:* Meaning (as I take it) that he had Salary ſufficient of the *State* for his Service. For (as I after learned) they call an Officer that taketh Rewards, *Twice-paid.*

The next Morning early, there came to us the ſame *Officer*, that came to us at firſt with his Cane, and told us; *Hee came to conduct us to the* Strangers Houſe; *And that he had prevented the Houre, becauſe we might have the whole day before us, for our Buſineſſe. For* (ſaid hee) *If you will follow my Advice, there ſhall firſt goe with me ſome few of you, and ſee the place, and how it may be made convenient for you; And then you may ſend for your Sick, and the reſt of your Number, which ye will bring on Land.* Wee thanked him, and ſaid; *That this Care, which he tooke of deſolate Strangers,* GOD *would reward.* And ſo ſixe of us went on Land with him: And when wee were on Land, hee went before us, and turned to us, and ſaid; *He was but our Servant, and our Guide.* Hee led us through three faire Streets; And all the Way wee went, there were gathered ſome People on both ſides, ſtanding in a Row; But in ſo civill a faſhion, as if it had beene, not to wonder at us, but to welcome us; And divers of them, as wee paſſed by them, put their Armes a little abroad; which is their Geſture, when they bid any welcome. The *Strangers Houſe* is a faire and ſpacious Houſe, built of Brick, of ſomewhat a blewer Colour than our Brick; And with handſome Windowes, ſome of Glaſſe, ſome of a kinde of Cambrick oyled. Hee brought us firſt into a faire Parlour above ſtaires, and then asked us; *What number of Perſons we were? And how manie ſicke?* we anſwered, *We were in all (ſick and whole) one and fiftie Perſons, whereof*

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our ſicke were ſeventeene. He deſired us to have patience a little, and to ſtay till he came backe to us; which was about an Houre after; And then he led us to ſee the Chambers, which were provided for us, being in number nineteene. They having caſt it (as it ſeemeth) that foure of thoſe Chambers, which were better than the reſt, might receive four of the principall Men of our Company; And lodge them alone by themſelves; And the other fifteene Chambers were to lodge us, two and two together. The Chambers were handſome and chearefull Chambers, and furniſhed civilly. Then he led us to a long Gallery, like a Dorture, where hee ſhewed us all along the one ſide (for the other ſide was but wall and window,) ſeventeene Cells, very neat ones, having partitions of Cedar wood. Which Gallery, and Cells, being in all forty, (many more than we needed,) were inſtituted as an Infirmary for ſick Perſons. And he told us withall, that as any of our Sick waxed well, hee might bee removed from his Cell, to a Chamber: For which purpoſe there were ſet forth ten ſpare Chambers, beſides the Number we ſpake of before. This done, he brought us backe to the Parlour, and lifting up his Cane a little, (as they do when they give any Charge or Command) ſaid to us; *Yee are to know that the Cuſtome of the Land requireth, that after this day, and to morrow, (which we give you for removing your People from your Ship,) you are to keepe within doores for three daies. But let it not trouble you, nor doe not thinke your ſelves reſtrained, but rather left to your Reſt and Eaſe. You ſhall want nothing, and there are ſixe of our People appointed to attend you, for any Buſineſſe you may have abroad.* Wee gave him thankes, with all Affection and Reſpect, and ſaid; *GOD ſurelie is manifeſted in this Land.* We offered him alſo twenty Piſtolets; But he ſmiled, and onely ſaid; *What? Twice Paid!* And ſo hee left us. Soone after our Dinner was ſerved in; Which was right good Viands, both for Bread, and Meat: Better than any *Collegiate* Diet, that I have knowne in *Europe*. We had alſo Drinke of three ſorts, all wholeſome and good; Wine of the Grape; A Drinke of Graine, ſuch as is with us our Ale, but more cleare: and a kind of Sider made of a fruit of that Countrey; A wonderfull pleaſing and Refreſhing Drink. Beſides, there were brought in to us, great Store of thoſe Scarlet Orenges, for our Sicke; which (they ſaid) were an aſſured Remedy for ſickneſſe taken at Sea. There was given us alſo, a Box of ſmall gray, or whitiſh Pills, which they wiſhed our Sicke ſhould take, one of the Pills

every night before sleep; which (they said) would hasten their Recovery. The next day, after that our Trouble of Carriage, and Removing of our Men, and Goods out of our Ship, was somewhat setled and quiet, I thought good to call our Company together; and when they were assembled, said unto them; *My deare Friends; Let us know our selves, and how it standeth with us. We are Men cast on Land, as* Jonas *was, out of the* Whales Belly, *when we were as buried in the Deepe: And now wee are on Land, we are but betweene death and Life; For wee are beyond, both the Old World and the New; And whether ever we shall see* Europe, *GOD onely knoweth. It is a kinde of Miracle hath brought us hither: And it must be little lesse, that shall bring us hence. Therefore in regard of our Deliverance past, and our danger present, and to come, let us looke up to GOD, and every man reforme his owne waies. Besides we are come here amongst a* Christian People, *full of Pietie and Humanitie: Let us not bring that Confusion of face upon our selves, as to shew our vices, or unworthinesse before them. Yet there is more: For they have by Commandement, (though in forme of Courtesie) Cloystred us within these Walls for three daies: Who knoweth, whether it be not, to take some taste of our manners and conditions? And if they finde them bad, to banish us straight-waies; if good, to give us further time. For these Men, that they have given us for Attendance, may withall have an eye upon us. Therefore for GODS love, and as wee love the weale of our Soules and Bodies, let us so behave our selves, as we may be at peace with GOD, and may finde grace in the Eyes of this People.* Our Company with one voyce thanked me for my good Admonition, and promised me to live soberly and civilly, and without giving any the least occasion of Offence. So we spent our three dayes joyfully, and without care, in expectation what would be done with us, when they were expired. During which time, we had every houre joy of the Amendment of our Sick; who thought themselves cast into some Divine *Poole* of *Healing*; They mended so kindly, and so fast.

The Morrow after our three dayes were past, there came to us a new Man, that we had not seene before, clothed in Blew as the former was, save that his Turban was white with a small red Crosse on the Topp. Hee had also a Tippet of fine Linnen. At his Comming in, he did bend to us a little, and put his Armes abroad. We of our Parts saluted him in a very lowly and submissive manner; As looking that from him we should receive Sentence of Life, or Death. Hee desired to speake with

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some few of us: Whereupon sixe of us onely stayed, and the rest avoided the Roome. He said; *I am by Office Governour of this House of Strangers, and by Vocation I am a* Christian Priest; *And therefore am come to you, to offer you my service, both as Strangers, and chiefly as* Christians. *Some things I may tell you, which I think you will not be unwilling to heare. The State hath given you Licence to stay on Land for the space of sixe weekes: And let it not trouble you, if your occasions aske further time, for the Law in this point is not precise; And I doe not doubt, but my selfe shall be able to obtaine for you such further time, as may be convenient. Yee shall also understand, that the* Strangers House, *is at this time Rich, and much aforehand; For it hath laid up Revenew these 37. yeares: For so long it is since any Stranger arrived in this part: And therefore take ye no care. The* State *will defray you all the time you stay: Neither shall you stay one day the lesse for that. As for any Merchandize you have brought, ye shall be well used, and have your returne, either in Merchandize, or in Gold and Silver: For to us it is all one. And if you have any other Request to make, hide it not. For ye shall finde, we will not make your Countenance to fall, by the answer ye shall receive. Onely this I must tell you, that none of you must goe above a* Karan, (that is with them a Mile and an halfe) *from the walls of the Citie, without speciall leave.* Wee answered, after wee had looked a while upon one another, admiring this gracious and parent-like usage, *That we could not tell what to say: For we wanted words to expresse our Thanks, And his Noble free Offers left us nothing to aske. It seemed to us, that we had before us a picture of our* Salvation *in* Heaven: *For we that were a while since in the Lawes of Death, were now brought into a place, where we found Nothing but Consolations. For the Commandement laid upon us, we would not faile to obey it, though it was impossible but our Hearts should be enflamed to tread further upon this Happie and Holie Ground.* We added, *That our Tongues should first cleave to the Roofes of our Mouthes, ere wee should forget, either his Reverend Person, or this whole nation, in our Prayers.* We also most humbly besought him to accept of us as his true servants, by as just a Right, as ever Men on Earth were bounden; laying and presenting, both our Persons, and all we had at his feet. He said; *He was a Priest, and looked for a Priests reward, which was our Brotherly love, and the good of our Soules and Bodies.* So he went from us, not without Teares of Tenderneſse in his Eyes; And left us also confused with joy and kindneſse, saying amongst our selves, *That we were come into a land of Angels,*

which did appeare to us daily, and prevent us with Comforts, which we thought not of, much lesse expected.

The next day about ten of the Clocke, the Governour came to us againe, and after Salutations, said familiarly; *That he was come to visit us*; And called for a Chaire, and sat him downe; And we being some ten of us (the rest were of the meaner sort; or else gone abroad;) sate downe with him; And when wee were sett, he began thus. *We of this Island of Bensalem* (for so they call it in their Language) *have this; That by meanes of our solitary Situation; and of the Lawes of Secrecy, which we have for our Travellers, and our rare Admission of Strangers; we know well most part of the Habitable World, and are our selves unknowne. Therefore because he that knoweth least, is fittest to aske Questions, it is more Reason, for the Entertainment of the time, that ye aske mee Questions, than that I aske you.* Wee answered; *That we humbly thanked him, that he would give us leave so to doe: And that wee conceived by the taste we had already, that there was no worldly thing on Earth, more worthy to bee knowne, than the State of that happy Land. But above all* (we said) *since that we were met from the severall Ends of the world; and hoped assuredly, that we should meet one day in the* Kingdome *of* Heaven (*for that we were both Parts* Christians) *we desired to know (in respect that Land was so remote, and so divided by vast and unknowne Seas; from the Land, where our* SAVIOVR *walked on Earth) who was the* Apostle *of that Nation, and how it was converted to the faith?* It appeared in his face, that he tooke great Contentment in this our Question: He said; *Yee knit my Heart to you, by asking this Question in the first place; For it sheweth that you* First seeke the Kingdome of Heaven; *And I shall gladly, and briefly, satisfie your demand.*

About twenty Yeares after the Ascention of our SAVIOVR, *it came to passe, that there was seene by the people of* Renfusa, (*a City upon the Easterne Coast of our Island, within night, (the Night was Cloudy and Calme,) as it might be some mile in the Sea, a great Pillar of Light; Not sharpe, but in forme of a Columne, or* Cylinder, *rising from the Sea, a great way up towards Heaven; and on the topp of it was seene a large Crosse of Light, more bright and resplendent than the Body of the Pillar. Vpon vvhich so strange a Spectacle, the People of the City gathered apace together upon the Sands, to wonder; And so after put themselves into a number of small Boats to goe nearer to this Marveilous sight. But vvhen the Boats vvere come vvithin (about) sixty yards of the Pillar, they found themselves all*

bound,

bound, and could goe no further, yet so as they might move to goe about, but might not approach nearer: So as the Boats stood all as in a Theater, beholding this Light, as an Heavenly Signe. It so fell out, that there was in one of the Boats, one of the Wise Men, of the Society of Salomons House; which House or College, (my good Brethren) is the very Eye of this Kingdome; Who having a while attentively and devoutly viewed, and contemplated this Pillar and Crosse, fell downe upon his face; And then raised himselfe upon his knees, and lifting up his Hands to Heaven, made his prayers in this manner.

LOrd God of Heaven and Earth; thou hast vouchsafed of thy Grace, to those of our Order, to know thy Workes of Creation, and the Secrets of them; And to discerne (as farre as appertaineth to the Generations of Men) between Divine Miracles, Workes of Nature, Workes of Art, and Impostures, and Illusions of all sorts. I doe here acknowledge and testifie before this People, that the Thing we now see before our eyes, is thy Finger, and a true Miracle. And for-as-much, as wee learne in our Books, that thou never Workest Miracles, but to a Divine and Excellent End, (for the Lawes of Nature are thine owne Lawes, and thou exceedest them not but upon great cause) we most humbly beseech thee, to prosper this great Signe, And to give us the Interpretation and use of it in Mercy; Which thou dost in some part secretly promise, by sending it unto us.

When hee had made his Prayer, he presently found the Boate hee was in, moveable and unbound; whereas all the rest remained still fast; And taking that for an assurance of Leave to approach, hee caused the Boate to be softly, and with silence rowed towards the Pillar. But ere he came neare it, the Pillar and Crosse of Light brake up, and cast it selfe abroad, as It were into a Firmament of many Starres; which also vanished soone after, and there was nothing left to be seene, but a small Arke, or Chest of Cedar, dry, and not wet at

all with water, though it swam. And in the Fore-end of it, which was towards him, grew a small greene Branch of Palme; And when the wise man had taken it with all reverence, into his Boat, it opened of it selfe, and there were found in it, a Book, *and a* Letter; *Both written in fine Parchment, and wrapped in Sindons of Linnen. The* Book *contained all the* Canonicall Books *of the* Old *and* New Testament, *according as you have them; (For we know well what the* Churches *with you receive;) And the* Apocalypse *it selfe; And some other* Books *of the* New Testament, *which were not at that time written, were nevertheless in the* Booke. *And for the* Letter, *it was in these words.*

I Bartholomew, *a Servant of the Highest, and Apostle of* IESVS CHRIST, *was warned by an Angell that appeared to me, in a vision of Glory, that I should commit this* Arke *to the flouds of the Sea. Therefore I doe testifie and declare, unto that People, where* GOD *shall ordaine this* Arke *to come to Land, that in the same day is come unto them Salvation, and Peace, and Good Will, from the* Father, *and from the* LORD IESVS.

There was also in both these Writings, as well the Booke, *as the* Letter, *wrought a great Miracle, Conforme to that of the* Apostles, *in the Originall* Gift *of* Tongues. *For there being at that time, in this Land,* Hebrews, Persians, *and* Indians, *besides the Natives, every one read upon the* Booke, *and* Letter, *as if they had been writen in his owne Language. And thus was this Land saved from infidelitie; (as the Remaine of the Old World was from Water) by an* Arke, *through the Apostolicall and Miraculous* Euangelisme *of* S. Bartholomew. And here he paused, and a Messenger came, and called him forth from us. So this was all that passed in that Conference.

The next Day, the same Governour came againe to us, immediately after Dinner, and excused himselfe, saying; *That the Day before he was called from us somewhat abruptly, but now hee would make us amends, and spend time with us, if wee held his Company and Conference agreeable;* We answered; *That we held it so agreeable and pleasing to us, as wee forgot both Dangers past, and*

Feares

Feares to come, for the time wee heard him speake; And that wee thought an Houre spent with him, was worth Yeares of our former life. Hee bowed himselfe a little to us, and after we were sett againe, he said; *Well, the Questions are on your part.* One of our Number said, after a little Pause; *That there was a Matter, wee were no lesse desirous to know, than fearefull to aske, least wee might presume too farre. But encouraged by his rare Humanity towards us, (that could scarce thinke our selves Strangers, being his vowed and professed Servants,) wee would take the Hardinesse to propound it: Humbly beseeching him, if hee thought it not fit to bee answered, that he would pardon it, though he rejected it.* We said; *We well observed those his words, which he formerly spake, that this happy Island, where we now stood, was knowne to few, and yet knew most of the Nations of the World, which we found to bee true, considering they had the Languages of* Europe, *and knew much of our State and Businesse; And yet we in* Europe (*notwithstanding all the remote Discoveries, and Navigations of this last Age*) *never heard any of the least Inkling or Glimpse of this Island. This wee found wonderfull strange; For that all Nations have Enterknowledge one of another, either by Voyage into Forraine Parts, or by Strangers that come to them: And though the Traveller into a Forreine Countrey, doth commonly know more by the Eye, than he that stayeth at home can by relation of the Traveller; Yet both wayes suffice to make a mutuall Knowledge, in some degree, on both parts. But for this Island, wee never heard tell of any Ship of theirs, that had been seen to arrive upon any shore of* Europe; *No, nor of either the* East *or* West Indies, *nor yet of any Ship of any other part of the World, that had made returne from them. And yet the Marvell rested not in this. For the Situation of it (as his Lordship said,) in the secret Conclave of such a vast Sea mought cause it. But then, that they should have Knowledge of the Languages, Bookes, Affaires, of those that lye such a distance from them, it was a thing wee could not tell what to make of; For that it seemed to us a condition and Proprietie of Divine Powers and Beings, to be hidden and unseene to others, and yet to have others open, and as in a light to them.* At this speech the Governour gave a gracious smile & said; *That we did well to aske pardon for this Question we now asked; For that it imported, as if we thought this Land a Land of Magicians, that sent forth Spirits of the Ayre into all parts, to bring them Newes, and Intelligence of other Countries.* It was answered by us all, in all possible humblenesse, but yet with a Countenance taking knowledge, that we knew that

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he ſpake it but merrily. *That we were apt enough to thinke, there was ſomewhat ſupernaturall in this Iſland, but yet rather as Angelicall, than Magicall. But to let his Lordſhip know truely, vvhat it was that made us tender and doubtfull to aske this Queſtion, it vvas not any ſuch conceit, but becauſe wee remembred, hee had given a Touch in his former Speech, that this Land had Lawes of Secrecy touching Strangers*: To this he ſaid; *Yo remember it aright: And therefore in that I ſhall ſay to you, I muſt reſerve ſome particulars, vvhich it is not lawfull for me to reveale; but there will be enough left, to give you ſatisfaction.*

You ſhall underſtand (that vvhich perhaps you vvill ſcarce thinke credible) that about three thouſand Yeares agoe, or ſomewhat more, the Navigation of the World (ſpecially for remote Voyages) was greater than at this Day. Doe not thinke with your ſelves, that I know not how much it is increaſed with you, within theſe threeſcore Years: I know it well; And yet I ſay, greater then, than now: Whether it was, that the Example of the Arke, *that ſaved the Remnant of Men, from the* univerſall Deluge, *gave Men confidence to adventure upon the Waters; Or what it was; but ſuch is the truth. The* Phœnicians, *and ſpecially the* Tyrians, *had great Fleets. So had the* Carthaginians *their Colony, which is yet further Weſt. Toward the Eaſt the Shipping of* Egypt, *and of* Paleſtina, *was likewiſe great.* China *alſo, and the great* Atlantis, *(that you call* America) *which have now but Iunks, and Canoa's, abounded then in tall Ships. This Iſland, (as appeareth by faithfull Regiſters of thoſe times) had then fifteene hundred ſtrong Ships, of great content. Of all this, there is with you ſparing Memory, or none; But wee have large Knowledge thereof.*

At that time, this Land was knowne and frequented by the Ships and Veſſels of all the Nations before named. And (as it commeth to paſſe) they had many times Men of other Countries, that were no Saylers, that came with them; As Perſians, Chaldeans, Arabians; *So as almoſt all Nations of Might and Fame reſorted hither; Of whom, we have ſome Stirps, and little Tribes with us; at this day. And for our owne Ships, they went ſundry Voyages, as well to your* Streights, *which you call the* Pillars *of* Hercules, *As to other parts in the* Atlantique *and* Mediterrane Seas; *As to* Paguin, *(which is the ſame with* Cambalaine) *and* Quinzy, *upon the Orientall Seas, as farre as to the Borders of the Eaſt* Tartary.

At the ſame time, and an Age after, or more, the Inhabitants of the great Atlantis *did flouriſh. For though the Narration and De-*

ſcription

ſcription which is made by a great Man *with you, that the Deſcendents of* Neptune *planted there; and of the Magnificent Temple, Pallace, City, and Hill; and the manifold ſtreames of goodly Navigable Rivers, (which as ſo many Chaines invironed the ſame Site, and Temple; And the ſeverall Degrees of Aſcent, whereby Men did climbe up to the ſame, as if it had beene a* Scala Cœli; *be all Poeticall and Fabulous: Yet ſo much is true, that the ſaid Countrey of* Atlantis; *As well that of* Peru *then called* Coya, *as that of* Mexico *then named* Tyrambel, *were mighty and proud Kingdomes, in Armes, Shipping, and Riches: So mighty, as at one time, (or at leaſt within the ſpace of ten yeares,) they both made two great Expeditions; They of* Tyrambel *through the* Atlantique *to the* Mediterrane Sea; *and they of* Coya, *through the South Sea upon this our Iſland: And for the former of theſe, which was into* Europe, *the ſame Author amongſt you, (as it ſeemeth) had ſome relation from the* Ægyptian Prieſt, *whom he citeth. For Aſſuredly, ſuch a thing there was. But whether it were the Ancient* Athenians, *that had the glory of the Repulſe, and Reſiſtance of thoſe Forces, I can ſay nothing: But certaine it is, there never came backe, either Ship, or Man, from that Voyage. Neither had the other Voyage of thoſe of* Coya *upon us, had better fortune, if they had not met with Enemies of greater clemency. For the King of this Iſland, (by name* Altabin,) *a wiſe Man, and a great Warrier; Knowing well both his owne ſtrength, and that of his Enemies; handled the matter ſo, as he cut off their Land-Forces from their Ships, and entoyled both their Navy, and their Campe, with a greater Power than theirs, both by Sea and Land: And compelled them to render themſelves without ſtriking ſtroke: And after they were at his Mercy, contenting himſelfe onely with their Oath, that they ſhould no more beare Armes againſt him, diſmiſſed them all in ſafetie. But the* Divine Revenge *overtooke not long after thoſe proud Enterpriſes. For within leſſe than the ſpace of one Hundred Yeares, the* Great Atlantis *was utterly loſt and deſtroyed: Not by a great Earthquake, as your* Man *ſaith; (For that whole Tract is little ſubject to Earthquakes;) But by a particular Deluge, or Inundation; Thoſe Countries having, at this Day, farre greater Rivers, and farre higher Mountaines, to powre downe Waters, than any part of the Old World. But it is true, that the ſame Inundation was not deepe; Not paſt forty foot, in moſt places, from the Ground; So that, although it deſtroyed Man and Beaſt generally, yet ſome few wild Inhabitants of the Wood eſcaped. Birds alſo were ſaved by flying to the High Trees and Woods. For as for Men, although they had*

Buildings in many places, higher than the Depth of the Water; Yet that Inundation, though it were ſhallow, had a long Continuance; whereby they of the Vale, that were not drowned, periſhed for want of Food, and other things neceſſary. So as marvell you not at the thinne Population of America, nor at the Rudeneſſe and Ignorance of the People; For you muſt account your Inhabitants of America as a yong People; younger a thouſand yeares, at the leaſt, than the reſt of the World: For that there was ſo much time, betweene the Univerſall Floud, and their Particular Inundation. For the poore Remnant of Humane Seed, which remained in their Mountaines, Peopled the Countrey again ſlowly, by little and little; And being ſimple and a ſavage People (Not like Noah and his Sonnes, which was the chiefe Family of the Earth) they were not able to leave Letters, Arts, and Civilitie to their Poſteritie; And having likewiſe in their Montainous Habitations been uſed, (in reſpect of the Extreme Cold of thoſe Regions,) to cloath themſelves with the Skinnes of Tygers, Beares, and great Hairy Goats, that they have in thoſe Parts; When after they came downe into the Valley, and found the intolerable Heats which are there, and knew no meanes of lighter Apparell; they were forced to begin the cuſtome of Going Naked, which continueth at this day. Onely they take great pride and delight, in the Feathers of Birds; And this alſo they tooke from thoſe their Anceſtours of the Mountaines, who were invited unto it, by the infinite Flights of Birds, that came up to the high Grounds, while the Waters ſtood below. So you ſee, by this maine Accident of Time, wee loſt our Traffique with the Americans, with whom, of all others, in regard they lay neareſt to us, wee had moſt Commerce. As for the other Parts of the World, it is moſt manifeſt, that in the Ages following, (whether it were in reſpect of Warres, or by a naturall Revolution of Time,) Navigation did every where greatly decay; And ſpecially, farre Voyages, the rather by the Uſe of Gallies, and ſuch Veſſells as could hardly brooke the Ocean) were altogether left and omitted. So then, that Part of Entercourſe, which could bee from other Nations, to Sayle to us; you ſee how it hath long ſince ceaſed; Except it were by ſome rare Accident, as this of yours. But now of the Ceſſation of that other Part of Entercourſe, which mought bee by our Sayling to other Nations, I muſt yeeld you ſome other Cauſe. For I cannot ſay, (if I ſhall ſay truelie,) but our Shipping, for Number, Strength, Mariners, Pylots, and all things that appertaine to Navigation, is as great as ever; And

therefore

therefore why we should sit at home, I shall now give you an account by it selfe; And it will draw nearer, to give you satisfaction, to your principall Question.

There raigned in this Island, about 1900. yeares agoe, a King, whose memory of all others we most adore; Not Superstitiously, but as a Divine Instrument, though a Mortall Man: His Name was Salomona: And we esteeme him as the Law-giver of our Nation. This King had a large heart, inscrutable for good; and was wholly bent to make his Kingdome and People Happy. He therefore taking into Consideration, how sufficient and substantive this Land was, to maintain it selfe without any ayd (at all) of the Forrainer; Being 5600. Mile in Circuit, and of rare Fertility of Soyle, in the greatest part thereof; And finding also the Shipping of this Countrey mought bee plentifully set on worke, both by Fishing, and by Transportations from Port to Port, and likewise by Sayling unto some small Islands that are not farre from us, and are under the Crowne and Lawes of this State; And recalling into his Memory, the happy and flourishing Estate, wherein this Land then was; So as it mought be a thousand wayes altered to the worse, but scarce any one way to the better; thought nothing wanted to his Noble and Heroicall Intentions, but onely (as farre as Humane foresight mought reach) to give perpetuity to that, which was in his time so happily established. Therefore amongst his other Fundamentall Lawes of this Kingdome, he did ordaine, the Interdicts and Prohibitions, which wee have touching Entrance of Strangers; which at that time (though it was after the Calamity of America) was frequent; Doubting Novelties, and Commixture of Manners. It is true, the like Law, against the Admission of Strangers without License, is an ancient Law, in the Kingdome of China, and yet continued in use. But there it is a poor Thing: And hath made them a curious, ignorant, fearefull, foolish Nation. But our Law-giver made his Law of another temper. For first, he hath preserved all points of Humanity, in taking Order, and making Provision for the Reliefe of Strangers distressed; whereof you have tasted. At which Speech (as reason was) wee all rose up, and bowed our selves. He went on. That King also still desiring to joyne Humanity and Policy together; And thinking it against Humanity, to detaine Strangers here against their wills; And against Policy, that they should returne, and discover their knowledge of this Estate, He tooke this Course: Hee did ordaine, that of the Strangers, that should be permitted to Land, as many (at all times) mought depart as many as would; But as many as would stay, should have very good Conditions, and Meanes to live,

from the State. Wherein he saw so farre, that now in so many Ages since the Prohibition, we, have memory, not of one Ship that ever returned, and but of thirteen Persons onely, at severall times, that chose to returne in our Bottomes. What those few that returned, may have reported abroad, I know not. But you must thinke, Whatsoever they have said, could be taken where they came, but for a Dreame. Now for our Travelling from hence into Parts abroad, our Law-giver thought fit, altogether to restraine it. So is it not in China. For the Chineses sayle where they will, or can; which sheweth, that their Law of Keeping out Strangers, is a Law of Pusillanimity, and feare. But this restraint of ours, hath one onely Exception, which is admirable; Preserving the good which commeth by communicating with Strangers, and avoiding the Hurt; And I will now open it to you. And here I shall seeme a little to digresse, but you will by and by finde it pertinent. Ye shall understand, (my deare Friends,) that amongst the Excellent Acts of that King, one above all hath the preheminence. It was the Erection, and Institution of an Order, or Societie, which we call Salomons House; The Noblest Foundation, (as wee thinke,) that ever was upon the Earth; And the Lanthorne of this Kingdome. It is dedicated to the Study of the Workes and Creatures of GOD. Some thinke it beareth the Founders Name a little corrupted, as if it should be Solamona's House. But the Records write it, as it is spoken. So as I take it to be denominate of the King of the Hebrewes, which is famous with you, and no Stranger to us; For wee have some Parts of his Workes, which with you are lost; Namely that Naturall Historie, which he wrote of all Plants, from the Cedar of Libanus, to the Mosse that groweth out of the Wall; And of all things that have Life and Motion. This maketh me thinke, that our King finding himselfe to Symbolize, in many things, with that King of the Hebrewes (which lived many yeares before him) honoured him with the Title of this Foundation. And I am the rather induced to be of this Opinion, for that I finde in ancient Records, this Order or Society is sometimes called Salomons House; And sometimes the Colledge of the Sixe Dayes Workes; whereby I am satisfied, That our Excellent King had learned from the Hebrewes, That GOD had created the World, and all that therein is, within sixe Dayes; And therefore he instituting that House, for the finding out of the true Nature of all Things (whereby GOD mought have the more Glory in the Workmanship of them, and Men the More fruit in the Use of them,) did give it also that second Name. But now to come to our present purpose. When the King had forbidden, to all his People, Navi-

gation

gation into any Part, that was not under his Crowne, hee made nevertheleſſe this Ordinance; That every twelve yeares there ſhould be ſet forth, out of this Kingdome, two Ships, appointed to ſeverall Voyages; That in either of theſe Ships, there ſhould be a Miſſion of three of the Fellowes, or Brethren of Salomons Houſe; whoſe Errand was onely to give us Knowledge of the Affaires and State of thoſe Countries, to which they were deſigned; And eſpecially of the Sciences, Arts, Manufactures, and Inventions of all the World; And withall to bring unto us, Bookes, Inſtruments, and Patternes, in every kinde: That the Shippes, after they had landed the Brethren, ſhould returne; And that the Brethren ſhould ſtay abroad till the new Miſſion, The Ships are not otherwiſe fraught, than with Store of Victuals, and good Quantity of Treaſure to remaine with the Brethren, for the buying of ſuch Things, and rewarding of ſuch Perſons, as they ſhould thinke fit. Now for me to tell you, how the Vulgar ſort of Marriners are contained from being diſcovered at Land; And how they that muſt be put on ſhore for any time, colour themſelves under the Names of other Nations; And to what places theſe Voyages have beene deſigned; And what places of Rendezvous are appointed for the new Miſſions; And the like circumſtances of the Practique; I may not doe it; Neither is it much to your deſire. But thus you ſee, we maintaine a Trade, not for Gold, Silver, or Jewels; Nor for Silks; Nor for Spices; Nor any other Commodity of Matter; But onely for Gods firſt Creature, which was Light: To have Light (I ſay) of the Growth of all Parts of the World. And when hee had ſaid this, he was ſilent; And ſo were we all. For indeed we were all aſtoniſhed, to heare ſo ſtrange things ſo probably told. And he perceiving that we were willing to ſay ſomewhat, but had it not ready, in great Courteſie tooke us off, and deſcended to aske us Queſtions of our Voyage and Fortunes, and in the end concluded, that we mought doe well, to thinke with our ſelves, what time of ſtay we would demand of the State; And bade us not to ſcant our ſelves; For he would procure ſuch time as we deſired. Whereupon we all roſe up and preſented our ſelves to kiſſe the skirt of his Tippet, but he would not ſuffer us; and ſo tooke his leave. But when it came once amongſt our People, that the State uſed to offer Conditions to Strangers, that would ſtay, we had worke enough to get any of our Men to looke to our Ship; And to keep them from going preſently to the Governour, to crave conditions. But with much adoe wee refrained them, till we mought agree what courſe to take.

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We tooke our ſelves now for free men, ſeeing there was no danger of our utter Perdition; And lived moſt joyfully, going abroad, and ſeeing what was to bee ſeene, in the Citie and places adjacent, within our *Tedder*; And obtaining acquaintance with many of the Citie, not of the meaneſt Qualitie; At whoſe hands we found ſuch Humanitie, and ſuch a freedome and deſire to take Strangers, as it were, into their Boſome, as was enough to make us forget all that was deare to us, in our owne Countries: And continually we met with many things, right worthy of Obſervation, and Relation: As indeed, if there bee a Mirrour in the World, worthy to hold Mens Eyes, it is that Countrey. One day there were two of our Company bidden to a *Feaſt* of the *Family*, as they call it. A moſt Naturall, Pious, and Reverend Cuſtome it is, ſhewing that Nation to be compounded of all Goodneſſe. This is the manner of it. It is granted to any Man, that ſhal live to ſee thirty Perſons, deſcended of his Body, alive together, and all above three yeares old, to make this *Feaſt*, which is done at the coſt of the State. The *Father* of the *Family*, whom they call the *Tirſan*, two dayes before the *Feaſt*, taketh to him three of ſuch Friends as he liketh to chuſe, And is aſſiſted alſo by the Governour of the Citie, or Place, where the *Feaſt is* celebrated; And all the *Perſons* of the *Family*, of both Sexes, are ſummoned to attend him. Theſe two dayes the *Tirſan* ſitteth in Conſultation, concerning the good Eſtate of the *Family*. There, if there be any Diſcord or Sutes betweene any of the *Family*, they are compounded and appeaſed. There, if any of the Family be diſtreſſed or decayed, order is taken for their Reliefe, and competent meanes to live. There, if any bee ſubject to vice, or take ill Courſes, they are reproved, and Cenſured. So likewiſe, Direction is given touching Marriages, and the courſes of life, which any of them ſhould take, with divers other the like Orders and Adviſes. The Governour aſſiſteth, to the end, to put in Execution, by his Publike Authority, the Decrees and Orders of the *Tirſan*, if they ſhould be diſobeyed; Though that ſeldome needeth; Such Reverence and Obedience they give, to the Order of Nature. The *Tirſan* doth alſo then, ever chuſe one Man from amongſt his Sonnes, to live in Houſe with him: Who is called, ever after, the *Sonne of the Vine*. The Reaſon will hereafter appeare. On the *Feaſt* day, the *Father*, or *Tirſan* commeth forth after Divine Service, into a large Roome, where the *Feaſt* is celebrated; Which Roome hath an Halfe-

Pace

Pace at the upper end. Againſt the wall, in the middle of the Half-Pace, is a Chaire placed for him, with a Table and Carpet before it. Over the Chaire is a State, made Round or Ovall, and it is of Ivy; An Ivy ſomewhat whiter than ours, like the Leafe of a Silver Aſpe, but more ſhining; For it is greene all winter. And the State is curiouſly wrought with Silver and Silke of divers Colours, broiding or binding in the Ivy; And is ever of the worke, of ſome of the Daughters of the Family; And vailed over at the Top, with a fine Net of Silk and Silver. But the Subſtance of it is true Ivy; whereof, after it is taken downe, the Friends of the Family are deſirous to have ſome Leafe or Sprig to keep. The *Tirſan* commeth forth with all his Generation or Linage, the Males before him, and the Females following him; And if there bee a Mother, from whoſe Body the Whole Linage is deſcended, there is a Traverſe placed in a Loft above on the right hand of the Chaire, with a privy Dore, and a carved Window of Glaſſe, leaded with Gold and Blew; Where ſhe ſitteth, but is not ſeene. When the *Tirſan* is come forth, he ſitteth downe in the Chaire; And all the Linage place themſelves againſt the Wall, both at his Backe, and upon the Returne of the Halfe-pace, in Order of their yeares, without difference of Sex, and ſtand upon their Feet. When he is ſet, the Roome being alwayes full of Company, but well kept, and without Diſorder; after ſome pauſe there commeth in from the lower end of the Roome, a *Taratan*, (which is as much as an *Herald*,) And on either ſide of him two *young Lads*; Whereof one carrieth a Scrowle of their ſhining yellow Parchment; And the other a cluſter of Grapes of Gold, with a long Foot or Stalke. The *Herald*, and *Children*, are clothed with Mantles of Sea-water greene Sattin; But the *Heralds* Mantle is ſtreamed with Gold, and hath a Traine. Then the *Herald* with three Curteſies, or rather Inclinations, commeth up as farre as the Halfe-pace; And there firſt taketh into his Hand the Scrowle. This Scrowle is the *Kings Charter*, containing Gift of Revenew, and many Priviledges, Exemptions, and Points of Honour, granted to the *Father* of the *Family*; And it is ever ſtiled and directed; *To ſuch an one, Our welbeloved Friend and Creditour*: Which is a Title proper onely to this Caſe. For they ſay, the King is Debter to no Man, but for Propagation of his Subjects. The Seale ſet to the *Kings Charter*, is the Kings Image, Imboſſed or moulded in Gold; And though ſuch *Charters* be expedited of Courſe, and

as

as of Right, yet they are varied by discretion, according to the Number and Dignitie of the *Family*. This *Charter* the *Herald* readeth aloud; And while it is read, the *Father* or *Tirsan*, standeth up, supported by two of his Sonnes; such as he chooseth. Then the *Herald* mounteth the Halfe-Pace, and delivereth the *Charter* into his Hand: And with that there is an Acclamation, by all that are present, in their Language, which is thus much; *Happy are the People of Bensalem*. Then the *Herald* taketh into his Hand from the other Childe, the Cluster of Grapes, which is of Gold; Both the Stalke, and the Grapes. But the Grapes are daintily enamelled; And if the Males of the *Family* be the greater number, the Grapes are enamelled Purple, with a little Sunne set on the Top; If the Females, then they are enamelled into a greenish yellow, with a Cressant on the Top. The Grapes are in number as many as there are Descendants of the *Family*. This Golden Cluster, the *Herald* delivereth also to the *Tirsan*; who presently delivereth it over, to that Sonne, that he had formerly chosen, to be in House with him: Who beareth it before his *Father*, as an Ensigne of Honour, when he goeth in publike ever after; And is thereupon called *the Sonne of the Vine*. After this Ceremony ended, the *Father* or *Tirsan* retireth; And after some time commeth forth againe to Dinner, where hee sitteth alone under the State, as before; And none of his Descendants sit with him, of what Degree or Dignity soever, except he hap to be of *Salomons House*. He is served onely by his owne Children, such as are Male; who performe unto him all service of the Table upon the knee; And the Women onely stand about him, leaning against the wall. The Roome below his Halfe-pace, hath Tables on the sides for the Guests that are bidden; Who are served with great and comely order; And towards the end of Dinner (which in the greatest Feasts with them, lasteth never above an Houre and a half) there is an *Hymne* sung, varied according to the Invention of him that composeth it; (for they have excellent Poesie,) But the Subject of it is (alwayes) the praises of *Adam*, and *Noah*, and *Abraham*; Whereof the former two Peopled the World, and the last was the *Father* of the *Faithfull*: concluding ever with a Thanksgiving for the *Nativity* of our *Saviour*, in whose Birth, the Births of all are onely Blessed. Dinner being done, the *Tirsan* retireth againe; And having withdrawne himselfe alone into a place; where he maketh some private Prayers, he commeth forth the third time, to give the Blessing;

sing; with all his Descendants, who stand about him as at the first. Then he calleth them forth by one and by one, by name, as he pleaseth, though seldome the Order of Age bee inverted. The person that is called, (the Table being before removed,) kneeleth down before the Chair, and the *Father* layeth his Hand upon his Head, or her Head, and giveth the Blessing in these words; *Sonne of Bensalem, (or Daughter of Bensalem,) thy Father saith it; The Man by whom thou hast Breath and Life speaketh the word; The Blessing of the Everlasting Father, the Prince of Peace, and the Holy Dove be upon thee, and make the dayes of thy Pilgrimage good and many.* This he saith to every of them; And that done, if there be any of his Sonnes, of eminent Merit and Vertue, (so they be not above two,) he calleth for them againe; and saith, laying his Arme over their shoulders, they standing; *Sonnes, it is well you are borne, give God the praise, and persevere to the end.* And withall delivereth to either of them a Jewell, made in the Figure of an Eare of Wheate, which they ever after weare in the front of their Turban, or Hatt. This done, they fall to Musicke and dances, and other recreations, after their manner, for the rest of the day. This is the full order of that *Feast.*

By that time, six or seven Dayes were spent, I was fallen into straight Acquaintance, with a *Merchant* of that *Citie*, whose Name was *Joabin*. He was a *Iew* and *Circumcised*: For they have some few stirps of *Iewes*, yet remaining among them, whom they leave to their owne Religion. Which they may the better doe, because they are of a farre differing Disposition from the *Iewes* in other Parts. For whereas they hate the Name of CHRIST; and have a secret inbred Rancour against the People amongst whom they live; these (contrariwise) give unto our SAVIOUR many high Attributes, and love the *Nation* of *Bensalem*, extremely. Surely this Man, of whom I speake, would ever acknowledge, that CHRIST was borne of a *Virgin*; and that he was more than a Man; And he would tell how GOD made him Ruler of the *Seraphims*, which guard his Throne; And they call him also the *Milken Way*, and the *Eliah* of the *Messiah*; and many other High Names; which though they be Inferiour to his Divine Majesty, yet they are farre from the Language of other *Jewes*. And for the Countrey of *Bensalem*, this Man would make no end of commending it, Being desirous by Tradition among the *Iews* there, to have it beleeved, that the Peo-

ple thereof were of the Generations of *Abraham*, by another Sonne, whom they call *Nachoran*; And that *Moses* by a secret *Cabala* ordained the Lawes of *Bensalem* which they now use; And that when the *Messias* should come, and sit in his Throne at *Hierusalem*, the King of *Bensalem*, should sit at his feet, whereas other Kings should keepe a great distance. But yet setting aside these *Iewish* Dreames, the Man was a wise Man, and learned, and of great Policy, and excellently seene in the Lawes and Customes of that Nation. Amongst other Discourses, one day, I told him, I was much affected with the Relation I had, from some of the Company, of their Custome, in holding the *Feast* of the *Family*; For that (me thought) I had never heard of a Solemnity, wherein Nature did so much preside. And because Propagation of Families, proceedeth from the Nuptiall Copulation, I desired to know of him, what Lawes and Customes they had concerning Marriage; and whether they kept Marriage well; and whether they were tyed to one Wife? For that where Population is so much affected, and such as with them it seemed to bee, there is commonly Permission of *Plurality* of *Wives*. To this he said; *You have Reason for to commend that excellent Institution of the* Feast *of the* Family; *And indeed we have Experience, that those* Families *that are partakers of the Blessings of that* Feast, *doe flourish and prosper ever after, in an extraordinary manner. But hear me now, and I will tell you what I know. You shall understand, that there is not under the Heavens so chaste a Nation, as this of Bensalem; Nor so free from all Pollution or foulenesse. It is the Virgin of the World, I remember, I have reade in one of your* Europæan *Bookes, of an holy Hermit amongst you, that desired to see the* Spirit *of* Fornication, *and there appeared to him, a little foule ugly* Aethiope: *But if hee had desired to see the* Spirit *of* Chastitie *of* Bensalem, *it would have appeared to him, in the likenesse of a faire beautifull* Cherubine. *For there is nothing, amongst Mortall Men, more faire and admirable, than the Chaste Mindes of this People. Know therefore, that with them there are no Stewes, no dissolute Houses, no Curtisans, nor any thing of that kinde. Nay they wonder (with detestation) at you in* Europe, *which permit such things. They say ye have put Marriage out of office: For Marriage is ordained a Remedie for unlawfull Concupiscence; And Naturall Concupiscence seemeth as a spurre to Marriage. But when Men have at hand a Remedy, more agreeable to their corrupt will, Marriage is almost expulsed. And therefore there are with you seene*

infinite

infinite Men, that marry not, but chuſe rather a libertine and impure ſingle Life, than to bee yoaked in Marriage; And many that doe marry, marry late, when the Prime and Strength of their Yeares is paſt. And when they doe marry, what is Marriage to them, but a very Bargaine; Wherein is ſought Alliance, or Portion, or Reputation, with ſome deſire (almoſt indifferent) of Iſſue; And not the faithfull Nuptiall Vnion of Man and Wife, that was firſt inſtituted. Neither is it poſſible, that thoſe that have caſt away ſo baſely, ſo much of their Strength, ſhould greatly eſteeme Children, (being of the ſame Matter,) as chaſte Men doe. So likewiſe during Marriage is the Caſe much amended, as it ought to be if thoſe things were tolerated onely for neceſſitie; No, but they remaine ſtill as a very Affront to Marriage. The Haunting of thoſe diſſolute places, or reſort to Curtezans, are no more puniſhed in Married Men, than in Batchelers. And the depraved Cuſtome of Change, and the delight in Meretricious Embracements, (where ſinne is turned into Art,) maketh marriage a dull thing, and a kinde of Impoſition, or Taxe. They heare you defend theſe things; as done to avoid greater Evills; As Advoutries, Deflouring of Virgins, Vnnaturall luſt, and the like. But they ſay, this is a prepoſterous Wiſdome; And they call it Lots offer, *who to ſave his Gueſts from abuſing, Offered his Daughters: Nay they ſay further, That there is little gained in this; For that the ſame Vices and Appetites, doe ſtill remaine and abound; Unlawfull Luſt being like a Furnace, that if you ſtop the Flames altogether, it will quench; But if you give it any vent, it will rage; As for Maſculine Love, they have no touch of it; And yet there are not, ſo faithfull and inviolate Friendſhips, in the world againe, as are there; And to ſpeake generally, (as I ſaid before,) I have not read of any ſuch Chaſtitie, in any People, as theirs. And their uſuall ſaying is,* That whoſoever is unchaſte cannot reverence himſelfe: *And they ſay,* That the reverence of a Mans ſelfe, is, next Religion, the chiefeſt bridle of all Vices. And when he had ſaid this, the good *Iew* pauſed a little; Whereupon, I farre more willing to heare him ſpeake on, than to ſpeake my ſelfe; yet thinking it decent, that upon his pawſe of Speech, I ſhould not be altogether ſilent, ſaid onely this; *That I would ſay to him, as the* Widow *of* Sarepta *ſaid to* Elias; *That hee was come to bring to Memorie our Sinnes; And that I confeſſe the* Righteouſneſſe *of* Benſalem, *was greater than the* Righteouſneſſe *of* Europe. At which ſpeech he bowed his Head, and went on this manner. *They have alſo many wiſe and excellent Lawes touching* Marriage.

They allow no Polygamie. *They have ordained that none doe intermarry, or contract, untill a Moneth be past from their first inter-view.* Marriage *without consent of Parents they doe not make void, but they mulct it in the Inheritors: For the Children of such* Marriages, *are not admitted to inherit, above a third Part of their Parents Inheritance. I have read in a* Book *of one of your* Men, *of a* Feigned Common-wealth, *where the Married couple are permitted, before they Contract, to see one another Naked. This they dislike: For they think it a Scorne, to give a Refusall after so familiar Knowledge: But because of many hidden Defects in Men and Womens Bodies, they have a more Civill way: for they have neare every Towne, a Couple of* Pooles, *(which they call* Adam *and* Eves Pooles,) *where it is permitted to one of the friends of the Man, & another of the friends of the Woman, to see them severally bath Naked.*

And as wee were thus in Conference, there came one that seemed to bee a Messenger, in a rich Huke, that spake with the *Jew*: whereupon he turned to me, and said; *You will pardon me, for I am commanded away in haste.* The next Morning hee came to me againe, joyfull, as it seemed, and said; *There is word come to the Governour of the Citie, that one of the* Fathers *of* Salomons House, *will be here this day Seven-night: Wee have seene none of them this Dozen Yeares. His Comming is in State; But the cause of his Comming is secret. I will provide you, and your Fellowes, of a good Standing to see his Entry.* I thanked him, and told him; *I was most glad of the Newes.* The day being come he made his Entry. He was a *Man* of middle Stature, and Age, comely of Person, and had an Aspect as if he pittied Men. He was cloathed in a Roabe of fine blacke Cloth, with wide Sleeves, and a Cape. His under Garment was of excellent white Linnen, downe to the Foot, girt with a girdle of the same; And a Sindon or Tippet of the same about his Neck. Hee had Gloves, that were curious, and set with Stone; And Shoes of Peach-coloured Velvet. His Necke was bare to the Shoulders. His Hat was like a Helmet, or *Spanish Montera*; And his locks curled below it decently: They were of Colour browne. His Beard was cut round, and of the same colour with his Haire, somewhat lighter. Hee was caried in a rich Charriot, without wheeles, Litter-wise, With two Horses at either end, richly trapped in blew Velvet Embroydered; and two Footmen on each side in the like Attire. The Charriot was all of Cedar, gilt and adorned with Chrystall; Save that the Fore-end had

Pannels

Pannells of Sapphires, set in Borders of Gold, and the Hinder-end the like of Emerauds of the *Peru* Colour. There was also a Sunne of Gold, Radiant upon the Top, in the Midst; And on the Top before, a small *Cherub* of Gold, with Wings displayed. The Charriot was covered with Cloth of Gold tissued upon Blew. He had before him fifty Attendants, young Men all, in white *Satten* loose Coats to the Mid Leg, and Stockings of white Silk; and Shoos of blew Velvet; and Hats of blew Velvet; with fine Plumes of divers Colours, set round like Hatbands. Next before the Chariot, went two Men, bare headed, in Linnen Garments downe to the foot, girt, and Shoes of blew Velvet, who carried the one a Crosier, the other a Pastorall Staffe, like a Sheep-hooke; Neither of them of Metall, but the Crosier of Balme-wood, the Pastorall Staffe of Cedar. Horse-Men hee had none, neither before, nor behind his Charriot: As it seemeth, to avoid all Tumult and Trouble. Behinde his Chariot, went all the Officers and Principals of the Companies of the Citie. He sate alone, upon Cushions, of a kinde of excellent Plush, blew; And under his Foot curious Carpets of Silke of divers Colours, like the Persian, but farre finer. He held up his Bare Hand, as he went, as blessing the people, but in Silence. The Street was wonderfully well kept; So that there was never any Army had their Men stand in better Battell-Array, than the People stood. The Windowes likewise were not crouded, but every one stood in them, as if they had beene placed. When the shew was past, the *Jew* said to mee; *I shall not be able to attend you as I would, in regard of some Charge the Citie hath layd upon me, for the Entertaining of this Great Person.* Three dayes after the *Jew* came to me againe, and said; *Ye are happy Men; For the* Father *of* Salomons House *taketh knowledge of your Being here, and commanded me to tell you, that he will admit all your Company to his presence, and have private Conference with one of you, that yee shall choose: And for this hath appointed the next day after to Morrow. And because he meaneth to give you his Blessing, hee hath appointed it in the Fore-Noone.* Wee came at our Day, and Houre, and I was chosen by my Fellowes for the private Accesse. We found him in a faire Chamber, richly hanged, and carpetted under Foot, without any Degrees to the State, he was set upon a Low Throne richly adorned, and a rich cloth of State over his Head, of Blew Sattin Embroidered. He was alone, save that hee had two Pages of Honour, on either Hand one, finely attired in White.

White. His Under Garments were the like that wee ſaw him weare in the Chariot; But in ſtead of his Gowne, he had on him a Mantle with a Cape, of the ſame fine Blacke, faſtned about him. When wee came in, as we were taught, we bowed Low at our firſt Entrance; And when wee were come neare his Chaire, he ſtood up, holding forth his Hand ungloved, and in Poſture of Bleſſing; And we every one of us ſtooped downe, and kiſſed the Hemme of his Tippet. That done, the reſt departed, and I remained. Then he warned the Pages forth of the Roome, and cauſed me to ſit downe beſide him, and ſpake to me thus in the *Spaniſh Tongue*.

GOD *bleſſe thee, my Sonne; I will give thee the greateſt Jewell I have. For I will impart unto thee, for the love of* GOD *and Men, a Relation of the true State of* Salomons Houſe. *Sonne, to make you know the true ſtate of* Salomons Houſe, *I will keepe this order. Firſt I will ſet forth unto you the* End *of our* Foundation. *Secondly, the* Preparations *and* Inſtruments *we have for our* VVorks. *Thirdly, the ſeverall* Employments *and* Functions *whereto our* Fellowes *are aſsigned. And fourthly the* Ordinances *and* Rites *which wee obſerve.*

The End *of our* Foundation *is the Knowledge of* Cauſes, *and Secret Motions of Things; and the Enlarging of the bounds of* Humane Empire, *to the Effecting of all Things poſsible.*

The Preparations *and* Inſtruments *are theſe. We have large and deep* Caves *of ſeveral Depths: The deepeſt are ſunke* 600. *Fathome: And ſome of them are digged and made under great Hills and Mountaines: So that if you reckon together the*

Depth

Depth of the Hill, and the Depth of the Cave, they are (some of them) above three Miles deep. For we finde, that the Depth of an Hill, and the Depth of a Cave from the Flat, is the same Thing; both remote alike, from the Sunne and Heavens Beames, and from the open Aire. These Caves we call the Lower Region. And wee use them for all Coagulations, Indurations, Refrigerations, and Conservations, of Bodies. We use them likewise for the Imitation of Naturall Mines; And the Producing also of New Artificiall Mettals, by Compositions and Materials which we use & lay there for many yeares. We use them also sometimes, (which may seeme strange) for Curing of some Diseases, and for Prolongation of Life, in some Hermits that choose to live there, well accommodated of all things necessary, and indeed live very long; By whom also we learne many things.

We have Burialls in severall Earths, where we put divers Cements, as the Chineses, doe their Porcellane. But we have them in greater Varietie, and some of them more fine. We also have great variety of Composts, and Soiles, for the Making of the Earth Fruitfull.

We have High Towers; The Highest about halfe a Mile in Height; And some of them likewise set upon High Mountaines: So that the Vantage of the Hill with the Tower, is in the Highest of them three Miles at least. And these Places we call the Vpper Region; Accounting the Aire betweene the High Places, and the Low, as a Middle Region. We use these Towers, according to their severall Heights, and Situations, for Insolation,

tion, Refrigeration, Conservation, *And for the* View *of divers* Meteors; *As* VVindes, Raine, Snow, Haile; *And some of the* Fiery Meteors *also. And upon them, in some Places, are Dwellings of* Hermits, *whom we visit sometimes, and instruct what to observe.*

We have great Lakes *both* Salt, *and* Fresh, *whereof we have use for the* Fish, *and* Fowle. *We use them also for* Burialls *of some* Naturall Bodies: *For wee finde a difference in Things buried in* Earth, *or in* Aire *below the* Earth; *and things buried in* VVater. *We have also* Pooles, *of which some doe straine* Fresh VVater *out of* Salt; *And others by Art doe turne* Fresh VVater *into* Salt. *We have also some* Rocks *in the Midst of the* Sea; *And some* Bayes *upon the* Shore *for some* Works, *wherein is required the* Aire *and* Vapour *of the* Sea. *We have likewise* violent Streames *and* Cataracts, *which serve us for many* Motions: *And likewise* Engines *for* Multiplying *and* Enforcing *of* Windes, *to set also on going divers* Motions.

We have also a Number of Artificiall Wells, *and* Fountaines, *made in Imitation of the* Naturall Sources *and* Bathes; *As tincted upon* Vitrioll, Sulphur, Steele, Brasse, Lead, Nitre, *and other* Mineralls: *And againe, wee have little* Wells *for* Infusions *of many* Things, *where the* Waters *take the Vertue quicker and better, than in* Vessels, *or* Basins. *And amongst them we have a* Water, *which we call* vvater *of* Paradise, *being, by that we doe to it, made very Soveraigne for* Health, *and* Prolongation *of* Life.

VVe

We have also Great and spacious Houses, where we imitate and demonstrate Meteors; As Snow, Haile, Raine, some Artificiall Raines of Bodies, and not of Water, Thunders, Lightnings; & Also Generations of Bodies in Aire; As Frogs, Flies, and diverse Others.

We have also certaine Chambers, which we call Chambers of Health, where we qualifie the Aire as we thinke good and proper for the Cure of divers Diseases, and Preservation of Health.

We have also faire and large Baths, of severall Mixtures, for the Cure of Diseases, and the Restoring of Mans Body from Arefaction: & And Others for the Confirming of it in Strength of Sinews, Vitall Parts, and the very Juyce and Substance of the Body.

We have also large and various Orchards, and Gardens; Wherein we do not so much respect Beauty, as Variety of Ground and Soile, proper for divers Trees, and Herbes: And some very spacious, where Trees and Berries are set, whereof we make divers Kindes of Drinks, besides the Vine-yards. In these we practise likewise all Conclusions of Grafting, and Inoculating, as well of Wilde-Trees, as Fruit-Trees, which produceth many Effects. And we make (by Art) in the same Orchards, and Gardens, Trees and Flowers, to come earlier or later than their Seasons; And to come up and beare more speedily than by their Naturall Course they doe. We make them also by Art greater much than their Nature; And their Fruit greater, and sweeter, and of differing Taste, Smell, Colour, and Figure, from their Nature. & And many of them we so

Order as that they become of Medicinall Use.

We have also Meanes to make divers Plants, rise by Mixtures of Earths without Seeds; And likewise to make divers New Plants, differing from the Vulgar; and to make one Tree or Plant turne into another.

We have also Parkes, and Enclosures of all Sorts, of Beasts, and Birds; which we use not onely for View or Rareness, but likewise for Dissections, and Trials; That thereby may take light, what may be wrought upon the Body of Man. Wherein wee finde many strange Effects; As Continuing Life in them, though divers Parts, which you account Vitall, be perished, and taken forth; Resuscitating of some that seeme Dead in Appearance; And the like. We try also all Poysons, and other Medicines upon them, as well of Chirurgery, as Physicke. By Art likewise, we make them Greater, or Taller, than their Kinde is; And contrary-wise Dwarfe them and stay their Growth: Wee make them more Fruitfull, and Bearing than their Kinde is; And contrary-wise Barren and not Generative. Also we make them differ in Colour, Shape, Activity, many wayes. We finde Meanes to make Commixtures & Copulations of diverse Kindes; which have produced many New Kinds, and them not Barren, as the generall Opinion is. We make a number of Kindes, of Serpents, Wormes, Flies, Fishes, of Putrefaction; whereof some are advanced (in effect) to be Perfect Creatures, like Beasts, or Birds; And have Sexes, and doe Propagate. Neither do we this by Chance, but we know before hand, of what Matter and Commixture, what

what Kinde of those Creatures, will arise.

We have also Particular Pools, where we make Trialls upon Fishes, as wee have said before of Beasts and Birds.

We have also Places for Breed and Generation of those Kindes of Wormes, and Flies, which are of Speciall Use; such as are with you your Silk-wormes, and Bees.

I will not hold you long with recounting of our Brew-houses, Bake-houses, and Kitchins, where are made divers Drinkes, Breads, and Meats, Rare and of speciall Effects. Wines wee have of Grapes; And Drinkes of other Juyce, of Fruits, of Graines, and of Rootes; And of Mixtures with Honey, Sugar, Manna, and Fruits dryed and decocted: Also of the Teares or Woundings of Trees; And of the Pulp of Canes. And these Drinks are of Severall Ages, some to the Age or Last of forty yeares. We have Drinks also brewed with severall Herbs, and Roots, and Spices; Yea, with severall Fleshes, and White-Meats; whereof some of the Drinkes are such as they are in effect Meat and Drinke both: So that Divers, especially in Age, doe desire to live with them, with little or no Meat, or Bread. And above all we strive to have Drinks of Extreame Thinne Parts, To insinuate into the Body, and yet without all Biting, Sharpnesse, or Fretting; Insomuch as some of them put upon the Back of your Hand, will, with a little stay passe thorow to the Palme. and yet taste Mild to the Mouth. We have also Waters, wch wee ripen in that fashion, as they become Nourishing; So that they are indeed excellent Drinke;

And many will use no other. Breads *we have of Severall* Graines, Roots, *and* Kernels; *Yea, and some of* Flesh, *and* Fish, Dried; *With divers kinds of* Leavings, *and* Seasonings: *So that some doe extreamely move* Appetites; *Some doe nourish so, as Divers doe live of them, without any other* Meat; *Who live very long. So for* Meats, *wee have some of them so* beaten, *and made* tender, *and* mortified, *yet without all* Corrupting, *as a* Weake Heat *of the* Stomacke *will turne them into good* Chilus; *As well as a* Strong Heat *would* Meat *otherwise prepared. We have some* Meats *also, and* Breads, *and* Drinkes, *which taken by Men, enable them to* Fast *long after; And some other, that used make the very* Flesh *of* Mens Bodies, *sensibly more* Hard *and* Tough; *And their* Strength *farre greater, than otherwise it would be.*

We have Dispensatories, *or* Shops *of* Medicines. *Wherein you may easily thinke, if we have such* Varietie *of* Plants, *and* Living Creatures, *more than you have in* Europe, (*for we know what you have,*) *the* Simples, Drugges, *and* Ingredients *of* Medicines, *must likewise be in so much the greater* Varietie. *We have them likewise of divers* Ages, *and long* Fermentations. *And for their* Preparations, *wee have not onely all Manner of Exquisite* Distillations, *and* Separations, *and especially by* Gentle Heats, *and* Percolations *through divers* Strainers, *yea, and* Substances; *But also exact* Formes *of* Composition, *whereby they incorporate almost as they were* Naturall Simples.

We have also divers Mechanicall Arts, *which*

you have not; And Stuffes made by them; As Papers, Linnen, Silkes, Tissues; dainty Workes of Feathers of wonderfull Lustre; excellent Dies, and manie others: And Shops likewise as well for such as are not brought into Vulgar use amongst us, as for those that are. For you must know, that of the Things before recited, manie of them are growne into use throughout the Kingdome; But yet, if they did flow from our Invention, we have of them also for Patternes, and Principalls.

We have also Fournaces of great Diversities, and that keepe great Diversitie of Heats: Fierce and Quicke; Strong and Constant; Soft and Milde; Blowne, Quiet, Drie, Moist; And the like. But above all we have Heats, in Imitation of the Sunnes and Heavenly Bodies Heats, that passe divers Inequalities, and (as it were) Orbs, Progresses, and Returnes, whereby wee produce admirable effects. Besides, wee have Heats of Dungs; and of Bellies and Mawes of Living Creatures and of their Bloods, and Bodies; and of Hayes and Herbs laid up moist; of Lime unquenched; and such like. Instruments also which generate Heate onely by Motion. And further, Places for Strong Insolations; And againe, Places under the Earth, which by Nature, or Art, yeeld Heate. These divers Heats wee use, As the Nature of the Operation, which wee intend, requireth.

Wee have also Perspective-Houses, where we make Demonstrations of all Lights, and Radiations: And of all Colours: And out of Things uncoloured and Transparent, we can represent unto

to

to you all severall Colours; Not in Rain-bowes, (as it is in Gemmes, and Prismes,) but of themselves Single. We represent also all Multiplications of Light, which we carry to great Distance: and make so Sharpe, as to discerne small Points and Lines. Also all Colourations of Light. All Delusions and Deceits of the Sight, in Figures, Magnitudes, Motions, Colours: All Demonstrations of Shadowes. Wee finde also divers Meanes yet unknowne to you, of Producing of Light, originally, from divers Bodies. We procure meanes of Seeing Objects A-farre off; As in the Heaven, and Remote Places: And represent Things Neare as A-farre off; And Things A-farre off as Neare; Making Faigned Distances. Wee have also Helpes for the Sight, farre above Spectacles and Glasses in use. Wee have also Glasses and Means, to see Small and Minute Bodies, perfectly and distinctly; As the Shapes and Colours of Small Flies and Wormes, Graines, and Flawes, in Gemmes, which cannot otherwise be seene, Observations in Vrine and Bloud not otherwise to be seene. We make Artificiall Rain-Bowes, Halo's, and Circles about Light. We represent also all manner of Reflexions, Refractions, and Multiplications of Visuall Beames of Objects.

We have also Pretious Stones, of all kindes, many of them of great Beautie and to you unknown: Christalls likewise; And Glasses of divers kinds; And amongst them some of Metals Vitrificated, and other Materialls, besides those of which you make Glasse. Also a Number of Fossiles, and Imperfect

perfect Mineralls, *which you have not. Likewise* Loadstones *of Prodigious Vertue: And other rare* Stones, *both* Naturall *and* Artificiall.

Wee have also Sound-houses, *where we practise and demonstrate all* Sounds, *and their* Generation. *We have* Harmonies *which you have not, of* Quarter-Sounds, *and lesser* Slides *of* Sounds. *Diverse* Instruments *of* Musicke *likewise to you unknowne, some* sweeter *than any you have; Together with* Bells *and* Rings *that are dainty and sweet. Wee represent* small sounds *as* great *and* Deepe; *Likewise* Great sounds, Extenuate *and* sharpe; *We make diverse* tremblings *and* Warblings *of* sounds, *which in their* Originall *are* Entire. *We represent and imitate all* Articulate sounds *and* Letters, *and the* Voices *and* Notes *of* Beasts *and* Birds. *We have certaine* Helps, *which set to the* Eare *doe further the* Hearing *greatly. VVee have also diverse* strange *and* Artificiall Echo's, Reflecting *the* Voice *many times, and as it were* tossing *it: And some that give backe the* Voice Lowder *than it came, some* shriller, *and some* Deeper; *Yea some rendring the* Voice, Differing *in the* Letters *or* Articulate Sound, *from that they receive. VVe have also meanes to convey* sounds *in* Trunks *and* Pipes, *in strange* Lines *and* Distances.

Wee haue also Perfume-houses; *wherewith we joyne also* Practises *of* Taste. *VVe* Multiply smells, *which may seeme strange. Wee* Imitate smells, *making all* smells *to breath out of other* Mixtures *than those that give them. Wee make diverse* Imitations *of* Taste *likewise, so that they will*

will deceive any Mans Taſte. *And in this* Houſe *we containe alſo a* Confiture-Houſe; *where we make all* Sweet-Meats, Drie *and* Moiſt; *And divers pleaſant* Wines, Milks, Broaths, *and* Sallets, *farre in greater Varietie than you have.*

We have alſo Engine-Houſes, *where are prepared* Engines *and* Inſtruments *for all Sorts of* Motions. *There we imitate and practiſe to make* Swifter Motions, *than any you have, either out of your* Muskets, *or any* Engine *that you have: And to* Make *them, and* Multiply *them more* Eaſily, *and with* Small Force, *by* Wheeles, *and other* Meanes: *And to make them* Stronger, *and more* Violent, *than yours are; Exceeding your greateſt* Cannons *and* Baſilisks. *Wee repreſent alſo* Ordnance *and* Inſtruments *of* Warre, *and* Engines *of all Kindes: And likewiſe New* Mixtures *and* Compoſitions *of* Gunne-Powder, Wilde-Fires *burning in* VVater, *and* Unquenchable. *Alſo* Fire-workes *of all* Varietie *both for* Pleaſure, *and* Vſe. *Wee imitate alſo* Flights *of* Birds; *We have ſome* Degrees *of* Flying *in the* Ayre. *We have* Ships *and* Boats *for* Going *under* VVater, *and* Brooking *of* Seas; *Alſo* Swimming-Girdles *and* Supporters. *We have divers curious* Clocks; *And other like* Motions *of* Return: *And ſome* Perpetuall Motions. *We imitate alſo* Motions *of* Living Creatures, *by* Images *of* Men, Beaſts, Birds, Fiſhes, *and* Serpents; *We have alſo a great Number of other Various* Motions, *ſtrange for* Equality, Fineneſſe, *and* Subtilty.

We have alſo a Mathematicall-Houſe, *where*

are

are represented all Instruments, *as well of* Geometry, *as* Astronomy, *exquisitely made.*

We have also Houses *of* Deceits *of the* Senses; *where we represent all manner of* Feats *of* Jugling, False Apparitions, Impostures, *and* Illusions; *And their* Fallacies. *And surely you will easily beleeve, that we, that have so many* Things *truely* Naturall, *which induce* Admiration, *could in a* World *of* Particulars *deceive the* Senses, *if wee would disguise those* Things, *and labour to make them seeme more* Miraculous. *But we doe hate all* Impostures, *and* Lies: *Insomuch as wee have severely forbidden it to all our* Fellowes, *under paine of Ignominy and Fines, that they doe not shew any* Naturall VVorke *or Thing*, Adorned *or* Swelling; *but onely* Pure *as it is, and without all* Affectation *of* Strangenesse.

These are (*my Sonne*) *the riches of* Salomons House.

For the severall Employments *and* Offices *of our* Fellowes; *We have Twelve that Sayle into* Forraine Countries *under the* Names *of other* Nations, (*for our owne we conceale*;) *Who bring us the* Bookes, *and* Abstracts, *and* Patternes *of* Experiments *of all other* Parts. *These we call* Merchants *of* Light.

Wee have Three that Collect *the* Experiments *which are in all* Bookes, *These we call* Depredators.

Wee have Three that Collect *the* Experiments *of all* Mechanicall Arts; *And also of*

Liberall Sciences; *And also of practises which are not* Brought into Arts. *These we call* Mystery-men.

We have three that trie New Experiments, *Such as themselves thinke good. These we call* Pioners *or* Miners.

We have Three that Draw *the* Experiments *of the* Former Foure *into* Titles, *and* Tables, *to give the better light for the drawing of* Observations *and* Axiomes *out of them. These wee call* Compilers.

Wee have Three that bend themselves, Looking *into the* Experiments *of their* Fellowes, *and cast about how to draw out of them* Things *of* Use, *and* Practise *for* Mans life, *and* Knowledge, *as well for* Workes *as for* Plaine Demonstration *of* Causes, Meanes *of* Naturall Divinations, *and the easie and cleare* Discoverie *of the* Vertues *and* Parts *of* Bodies. *These wee call* Dowry-men *or* Benefactors.

Then after diverse Meetings *and* Consults *of our whole* Number, *to consider of the former* Labours *and* Collections, *we have Three that take care, out of them to* Direct New Experiments, *of a Higher* Light, *more* Penetrating *into* Nature *than the* Former. *These we call* Lamps.

We have three others that doe Execute *the* Experiments *so* Directed, *and* Report *them. These we call* Inoculators.

Lastly, we have three that raise the former Discoveries *by* Experiments, *into* Greater Observations, Axiomes, *and* Aphorismes. *These wee call* Interpreters *of* Nature.

We have also, as you must thinke. Novices *and* Apprentices, *that the Succession of the former Employed Men doe not faile; Besides a great Number of* Servants *and* Attendants, Men *and* Women. *And this we doe also: Wee have* Consultations, *which of the* Inventions *and* Experiences, *which we have discovered, shall be Published, and which not: And take all an* Oath *of* Secrecie, *for the concealing of those which we thinke fit to keepe Secret: Though some of those we doe reveale sometimes to the* State, *and some not.*

For our Ordinances *and* Rites: *We have two very* Long, *and* Faire Galleries: *In one of these wee place* Patternes *and* Samples *of all manner of the more* Rare *and* Excellent Inventions: *In the other wee place the* Statua's *of all* Principall Inventours. *There we have the* Statua *of your* Columbus, *that discovered the* West Indies: *Also the* Inventour *of* Shippes: *Your* Monke *that was the* Inventour *of* Ordnance, *and of* Gunpowder: *The* Inventour *of* Musicke: *The* Inventour *of* Letters: *The* Inventour *of* Printing: *The* Inventour *of* Observations *of* Astronomy: *The* Inventour *of* Works *in* Metall: *The* Inventour *of* Glasse: *The* Inventour *of* Silke *of the* Worme: *The* Inventour *of* Wine: *The* Inventour *of* Corne *and* Bread: *The* Inventour *of* Sugars: *And all these, by more certaine Tradition, than you have. Then have wee divers* Inventours *of our* Owne, *of* Excellent VVorkes; *Which since*

you have not seene, it were too long to make Descriptions of them; And besides, in the right Understanding of those Descriptions, you might easily erre. For upon every Invention of Valew, we erect a Statua to the Inventour, and give him a Liberall and Honourable Reward. These Statua's are, some of Brasse; some of Marble and Touchstone; some of Cedar and other speciall VVoods gilt and adorned; some of Iron; some of Silver; some of Gold.

Wee have certaine Hymnes and Services, which we say daily, of Laud and Thankes to God for his Marveilous Workes: And Formes of Prayers, imploring his Aide and Blessing, for the Illumination of our Labours; and the turning of them into Good and Holy Vses.

Lastly, we have Circuits or Visits; of divers Principall Cities of the Kingdome; where as it commeth to passe, we doe publish such New Profitable Inventions, as wee thinke good. And we doe also declare Naturall Divinations of Diseases, Plagues, Swarmes of Hurtfull Creatures, Scarcity, Tempests, Earthquakes, Great Inundations, Comets, Temperature of the Yeare, and divers other Things; And wee give Counsell thereupon, what the People shall doe, for the Prevention and Remedy of them.

And when He had said this, Hee stood up: And I, as I had beene taught, kneeled downe; and he laid his Right Hand upon my Head, and said; *GOD blesse thee my Sonne, and GOD blesse this Relation, which I have made. I give thee leave to Publish it, for the good of other Nations; For we here are in GODS Bosome, a Land unknowne.* And so he left me; Having assigned a valew of about two Thousand Duckets, for a Bounty to me and my Fellowes. For they give great Largesses, where they come, upon all occasions.

The rest was not Perfected.

MAG-

MAGNALIA NATVRÆ
PRAECIPUE QUOAD *VSVS HVMANOS.*

The Prolongation *of* Life.
The Restitution *of* Youth *in some* Degree.
The Retardation *of* Age.
The Curing *of* Diseases *counted* Incurable.
The Mitigation *of* Paine.
More Easie *and lesse* Loathsome Purgings.
The Encreasing *of* Strength *and* Activity.
The Encreasing *of* Ability *to suffer* Torture *or* Paine.
The Altering *of* Complexions: *and* Fatnesse, *and* Leanesse.
The Altering *of* Statures.
The Altering *of* Features.
The Encreasing *and* Exalting *of the* Intellectuall Parts.
Versions *of* Bodies *into other* Bodies.
Making *of* New Species.
Transplanting *of one* Species *into another.*
Instruments *of* Destruction, *as of* VVarre *and* Poison.

Exhilaration

Exhilaration *of the* Spirits, *and* Putting *them in good* Diſpoſition.
Force *of the* Imagination, *either upon another* Body, *or upon the* Body *it ſelfe.*
Acceleration *of* Time *in* Maturations.
Acceleration *of* Time *in* Clarifications.
Acceleration *of* Putrefaction.
Acceleration *of* Decoction.
Acceleration *of* Germination.
Making Rich Compoſts *for the* Earth.
Impreſsions *of the* Aire, *and* Raiſing *of* Tempeſts.
Great Alteration; *As in* Induration, Emollition, &c.
Turning Crude *and* Watry Subſtances, *into* Oyly *and* Unctious Subſtances.
Drawing of New Foods *out of* Subſtances *not now in* Uſe.
Making New Threds *for* Apparell; *And* New Stuffes, *Such as are* Paper, Glaſſe, &c.
Naturall Divinations.
Deceptions *of the* Senſes.
Greater Pleaſures *of the* Senſes.
Artificiall Mineralls *and* Cements.

FINIS.

Exhilaration of the Spirits, and Putting them in a good Disposition.
Force of the Imagination, either upon another Body, or upon the Body it self, &c.
Acceleration of Time in Maturations.
Acceleration of Time in Clarifications.
Acceleration of Putrefaction.
Acceleration of Coction.
Acceleration of Germination.
Making Rich Composts for the Earth.
Impressions of the Air, and Raising of Tempests.
Great Alteration; As in Induration, Emollition, &c.
Turning Crude and Watry Substances, into Oyly and Unctious Substances.
Drawing of New Foods out of Substances not now in Use.
Making New Threads for Apparell; And New Stuffes, Such as are Paper, Silk, &c.
Natural Divinations.
Deceptions of the Senses.
Greater Pleasures of the Senses.
Artificial Minerals and Cements.

FINIS.